CHAPTER 4

4 ENVIRONMENTAL CONSEQUENCES

This chapter contains the heart of the environmental evaluation document. Its purpose is threefold: first, to describe the environmental consequences of project development; second, to determine whether impacts of the project would significantly affect the human environment; and third, if significant impacts are identified, to determine whether those impacts will be mitigated so that the impacts are no longer significant under the project as proposed, as could be so mitigated through permit conditions.

Environmental consequences. On a resource-by-resource basis, this chapter describes the consequences to the environment that are expected from developing the True North project. These consequences are simply the changes from the baseline conditions, which are described in Chapter 3 (Affected Environment), that would occur.

Significance. To determine whether expected impacts would be significant, the Council on Environmental Quality (CEQ) regulations at 40 CFR, Section 1508.27, were used. Following is the excerpt from the regulations containing the definition of the term "significantly":

a) *Context.* This means that the significance of an action must be analyzed in several contexts such as society as a whole (human, national), the affected region, the affected interests, and the locality. Significance varies with the setting of the proposed action. For instance, in the case of a site-specific action, significance would usually depend upon the effects in the locale rather than in the world as a whole. Both short- and long-term effects are relevant.

b) *Intensity*. This refers to the severity of impact. Responsible officials must bear in mind that more than one agency may make decisions about partial aspects of a major action. The following should be considered in evaluating intensity:

    i. Impacts that may be both beneficial and adverse. A significant effect may exist even if the Federal agency believes that on balance the effect will be beneficial.

    ii. The degree to which the proposed action affects public health or safety.

iii. Unique characteristics of the geographic area such as proximity to historic or cultural resources, park lands, prime farmlands, wetlands, wild and scenic rivers, or ecologically critical areas.

iv. The degree to which the effects on the quality of the human environment are likely to be highly controversial.

v. The degree to which the possible effects on the human environment are highly uncertain or involve unique or unknown risks.

vi. The degree to which the action may establish a precedent for future actions with significant effects or represents a decision in principle about a future consideration.

vii. Whether the action is related to other actions with individually insignificant but cumulatively significant impacts. Significance exists if it is reasonable to anticipate a cumulatively significant impact on the environment. Significance cannot be avoided by terming an action temporary or by breaking it down into small component parts.

viii. The degree to which the action may adversely affect districts, sites, highways, structures, or objects listed in or eligible for listing in the National Register of Historic Places or may cause loss or destruction of substantial scientific, cultural, or historical resources.

ix. The degree to which the action may adversely affect an endangered or threatened species or its habitat that has been determined to be critical under the Endangered Species Act of 1973.

x. Whether the action threatens a violation of Federal, State, or local law or requirements imposed for the protection of the environment.

These significance criteria were used during the analyses of the consequences of project development on the existing environment.

To determine whether development, operation, or closure of the True North project would have a significant impact on the human environment, the appropriate context within which that determination could be made had to be defined. The context is based on the COE's jurisdiction over the project as described in Section 4.20.1. Generally, this is the area circumscribed by the True North Mine and the Fort Knox Mill at opposite ends, with the proposed road that connects them in between. (See Figure 1.2.2.) For those resources for which specific, measurable standards exist, often in the form of permit requirements, whether an impact would be significant was judged in the context of whether those standards could be met (water quality, air quality, noise). For those resources where a generally accepted process of mitigation exists so that significant impacts are avoided or minimized, significance was judged by whether that process would be adhered to (cultural resources, wetlands). For other resources that are usually strongly influenced by hydrologic patterns (vegetation, hydrology, fish, wildlife), the determination of significance was made in the context of the entire watersheds within which the project is located. For mine site effects this was the Dome and Little Eldorado creek drainages. The determination of significant impacts to other resources was considered in other contexts more appropriate to each specific resource. Throughout this chapter, the context for the determination of significance for each resource is described in the section that addresses the resource.

Mitigation. Section 2.3.21 (Mitigation) defines the term mitigation and its meanings under the CEQ guidelines. The section also lists many of the mitigation measures that FGMI has used already, or would use, to minimize impacts during project design, construction, operation, and closure.

An important use of mitigation is to ensure that significant environmental impacts do not occur. By applying appropriate mitigation measures, an action that might otherwise produce a significant impact can be made insignificant, thus eliminating or reducing controversy and concern. This chapter identifies many specific mitigation measures that have been taken, or would be taken, to prevent significant impacts from occurring.

4.1 SUMMARY

The True North project as proposed by FGMI, including procedures to mitigate potential impacts described in Section 2.3.21, would not result in significant impacts to the human environment in the True North project area. Some resources would be affected by short-term impacts, but these effects would not be significant.

Following is a resource-by-resource discussion of the project's expected impacts, whether the impacts would be significant, and, if so, whether they could be mitigated.

4.2 SURFACE WATER HYDROLOGY

For Sections 4.2 (Surface Water Hydrology), 4.3 (Groundwater Hydrology), and 4.4 (Water Quality), the significance of impacts is determined within the context of the Dome Creek and Little Eldorado Creek drainages, the hydrologic systems within which the mine site is situated.

The Hindenburg and East pits, the various development rock, ore, and growth medium stockpiles, and the maintenance complex would not intersect any channeled surface water flows such as creeks. The possibility of a slight increase in groundwater recharge, discussed below, likely would have little or no impact on the overall groundwater flow system. Such an increase in recharge might result in slight increases in groundwater discharge flows to streams downgradient of the site. Such increases, however, would be low in intensity and would not be significant within the context of the Dome Creek and Little Eldorado Creek drainages.

4.3 GROUNDWATER HYDROLOGY

Within the context of the Dome Creek and Little Eldorado Creek drainages, the proposed True North Project would not have significant impacts on groundwater flows for the following reasons.

- The open pits likely would receive minor flows of isolated groundwater above the permafrost, or from liquid water within permafrost encountered in the wall rocks. This water would be handled by pumping via sumps to a holding pond for evaporation or, if possible, land application. None of this water would be discharged from the site. Because of the isolated nature of these flows, their interception would not impact regional groundwater flow conditions.
- The mine plan has been designed such that no groundwater inflows to the pits are expected. Therefore, no dewatering or discharge of waters would be necessary.
- Approximately 47 percent of the pit area is underlain by permafrost. As mining progressed, the removal of permafrost might result in the potential for enhanced infiltration through the pits.
- The maximum estimated potential infiltration would be approximately 2.1 gpm. This represents a minimal potential increase in general groundwater system through-flow rates. This minimal increase in recharge likely would have no impact on general groundwater flow conditions.

4.3.1 POTENTIAL FLOWS FROM THE PIT WALLS DURING MINING

During mining of both open pits, isolated low flows of water likely will be encountered from both runoff of precipitation and minor flows from fractures within the pit walls. The proposed open pits both lie within some permafrost. As mining commences, isolated shallow water zones likely will be encountered above the permafrost, as evidenced by shallow water encountered in the area of temporary piezometer TN-976. These flows likely are isolated in nature, and should produce only low flow rates for short periods of time.

In addition, certain zones within the permafrost encountered within the pit walls also may include liquid water or high ice contents that may melt. These types of minor flows are frequently encountered in the open pit at the Fort Knox Mine. Both the presence of isolated flows from above the permafrost, and from isolated zones within the permafrost, likely will require the development of sumps within the pits to handle this water. The water will be pumped to a holding pond for evaporation or land application (watering of roads for dust control).

4.3.2 POTENTIAL GROUNDWATER INFLOW TO THE PIT AREAS

An important aspect of mine design is whether the proposed Hindenburg and East pits would intersect the groundwater table, and if dewatering would be required.

The potentiometric surface map presented in Figure 4.3-1 presents an assessment of the current potentiometric surface based on water levels observed in historic and current wells and temporary piezometers. The figure includes the planned Hindenburg and East pit designs. Groundwater elevations beneath the pit areas range from approximately 1,300 ft to 1,100 ft amsl. The deepest point planned for the Hindenburg pit is 1,170 ft, while the deepest point planned for the East pit is 1,210 ft.

A series of four cross-sections was developed to assess groundwater elevations in relation to the deepest points of both the Hindenburg and East pits. These cross-sections (labeled A-A', B-B', C-C', and D-D') are shown on Figures 4.3-2 through 4.3-5. The cross-section locations are shown on Figure 3.7-2. Cross-sections A-A' and D-D' pass through the deepest portion of the Hindenburg Pit, while cross-section B-B' passes through the deepest portion of the East Pit.

As shown on cross-section B-B', the groundwater table is estimated at more than 150 ft below the deepest portion of the East Pit. Therefore, no groundwater inflows from the main groundwater system are expected to occur within the East Pit. Both cross-sections A-A' and D-D' show there is a potential for the deepest portion of the Hindenburg Pit to penetrate the groundwater table. Groundwater elevations in this area were interpreted to be approximately 1,200 ft amsl, while the pit floor is currently planned to penetrate to 1,170 ft. Based on this assessment, the Hindenburg Pit may

penetrate the groundwater table by as much as 30 ft, potentially resulting in inflows of groundwater to the pit. Consequently, .mine plans for the Hindenburg Pit will be monitored and altered to inusre mining stays above the water table.

The area within the Hindenburg Pit extending below 1,200 ft, however, would be extremely limited, and represents only a small portion of the proposed pit. Also, there are uncertainties as to where the actual water table may be in this area at the time of mining. Lower water levels than expected could be encountered if the observed general decline in water levels continues over time. At present, the planned approach for pit development is to not mine into areas that would require active dewatering and discharge of groundwaters. Minor inflows to the pit would be handled through sumping, with water held onsite for evaporation or land application.

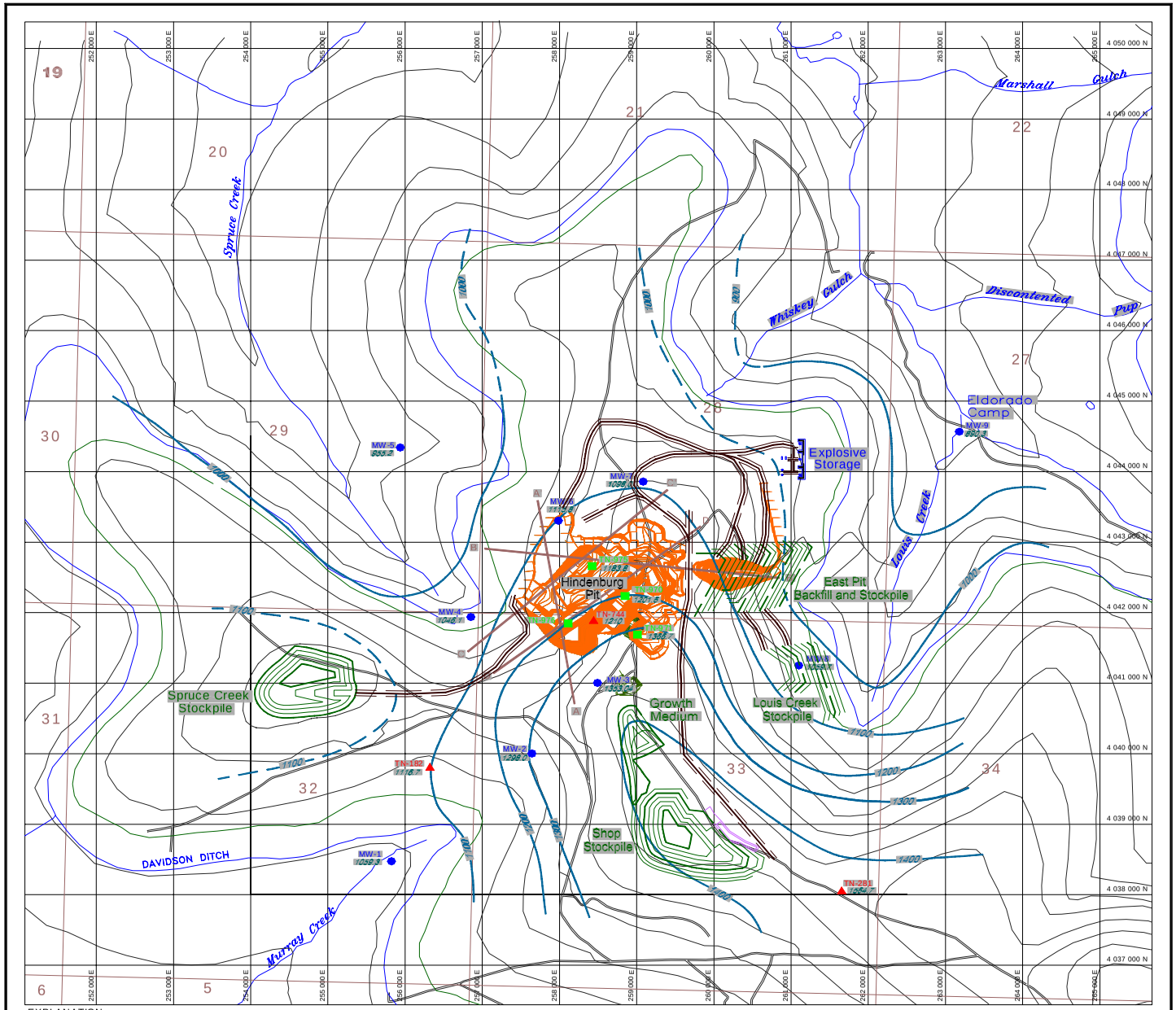

Figure 4.3-1

Potentiometric surface map

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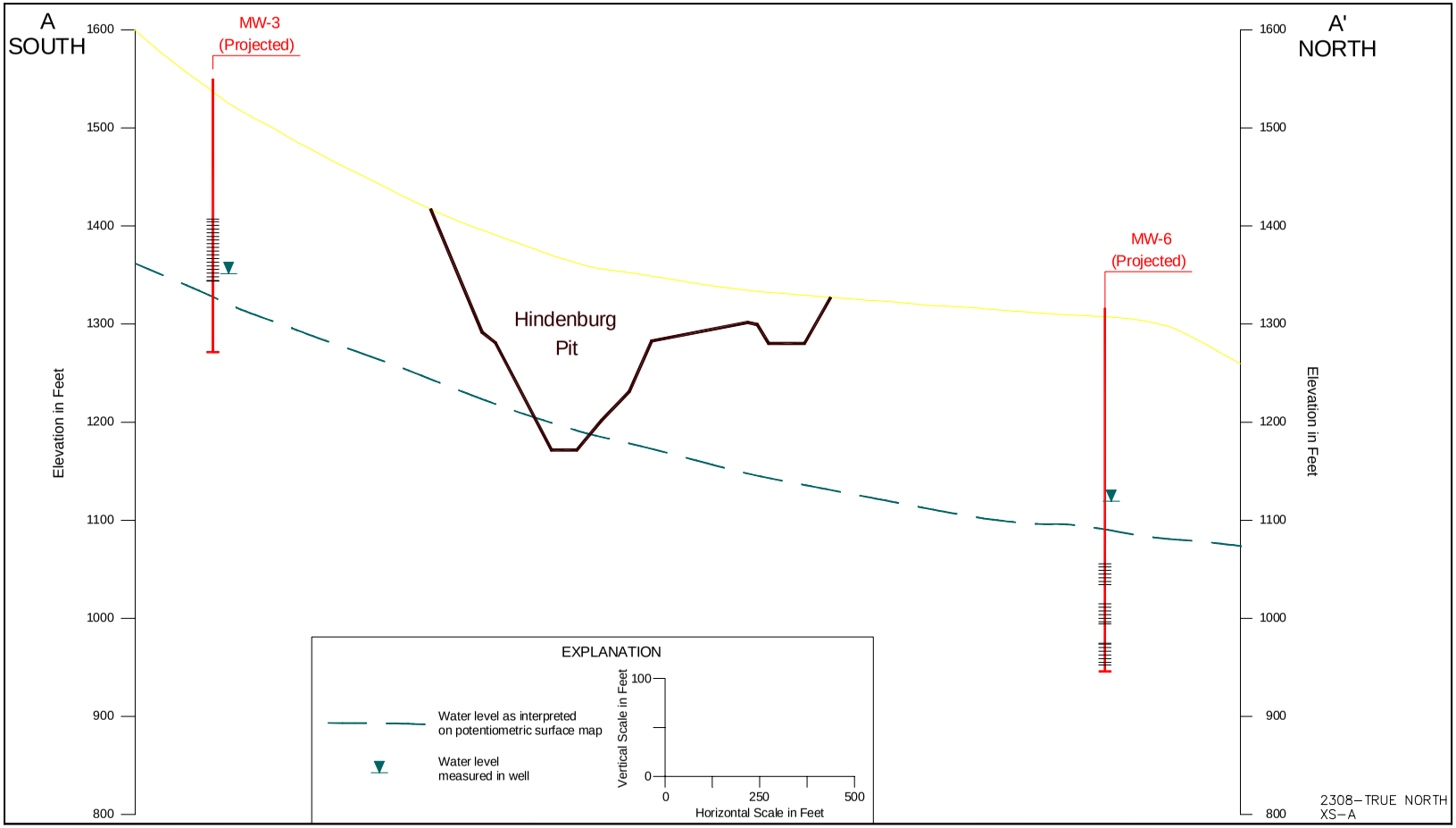
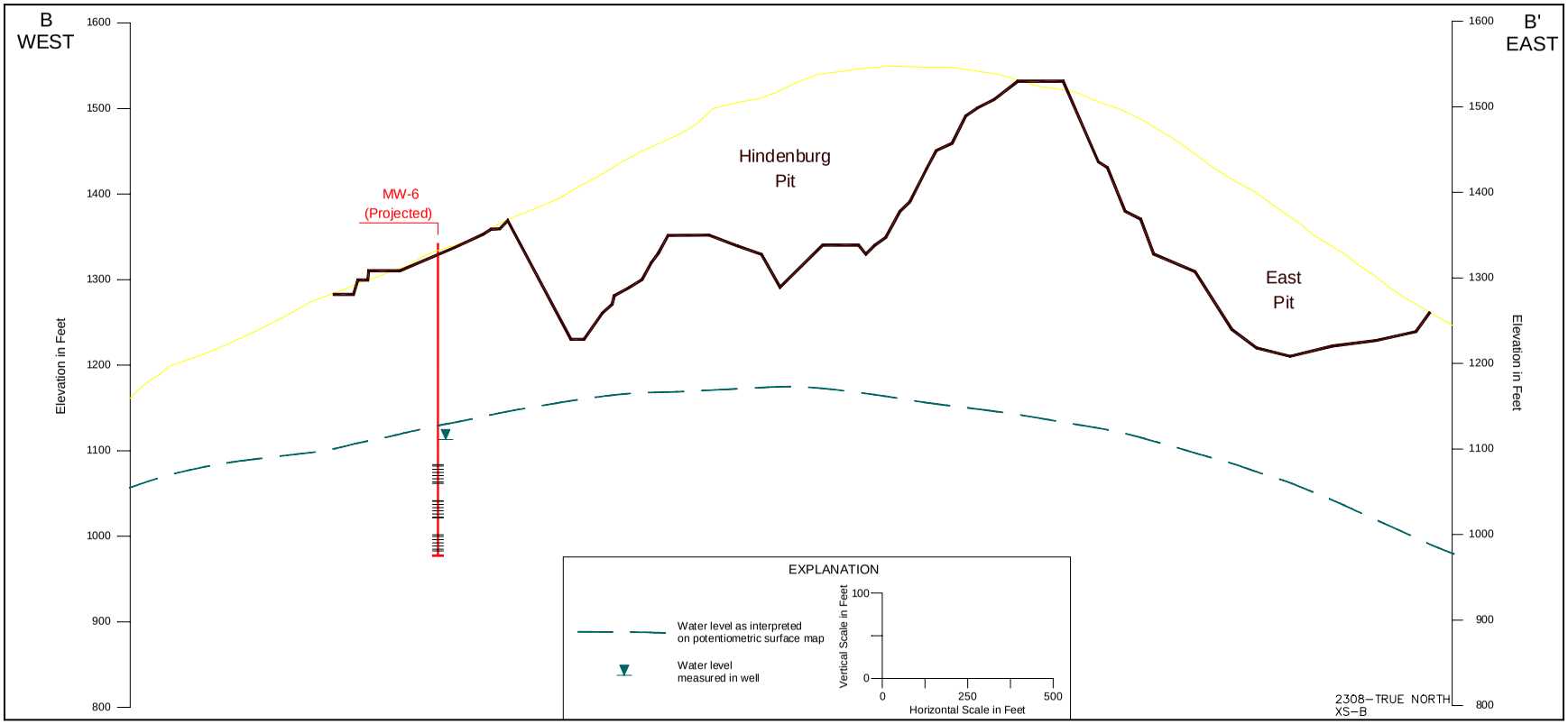
Figure 4-3-2 Mine pits cross section A-A'



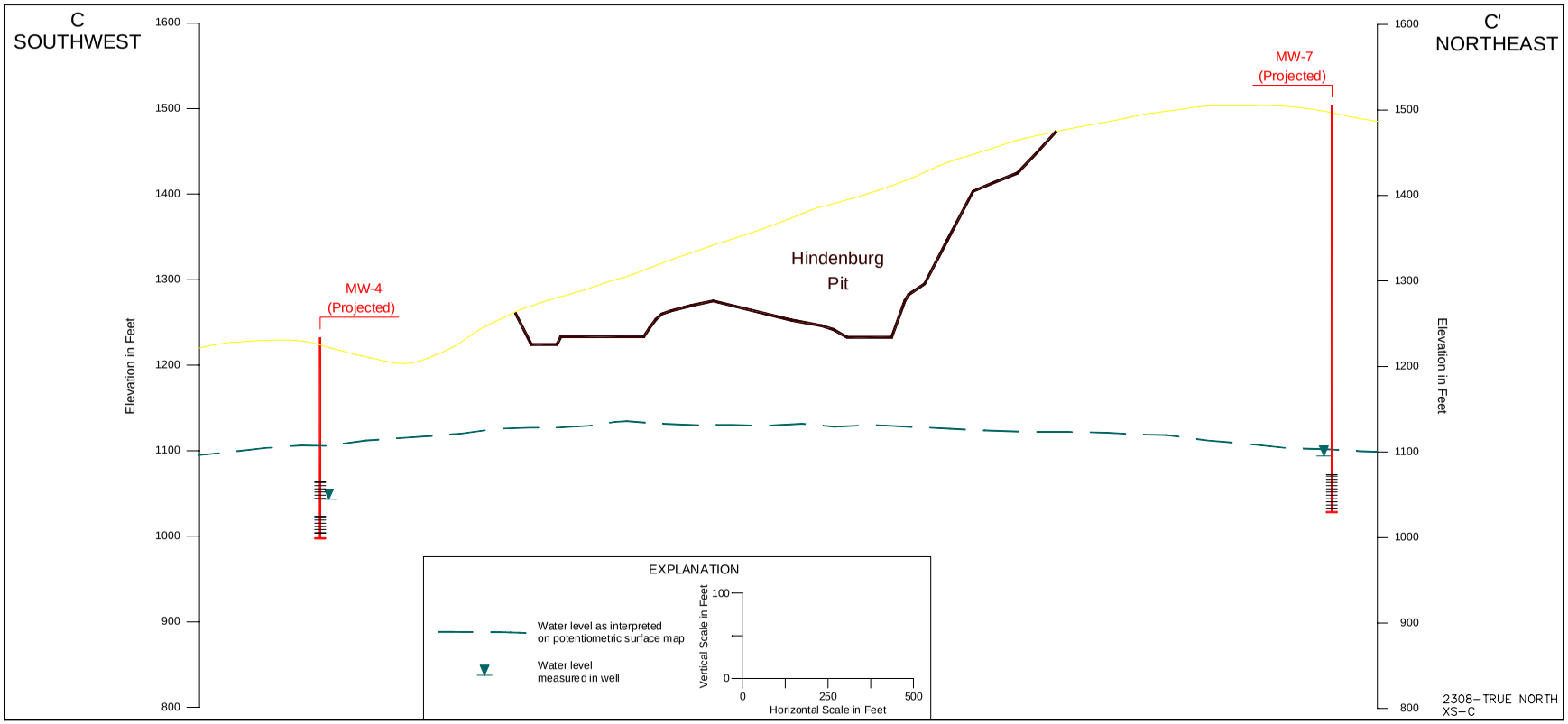
WATER MANAGEMENT CONSULTANTS

Figure 4.3-3 Mine pits cross section B-B'



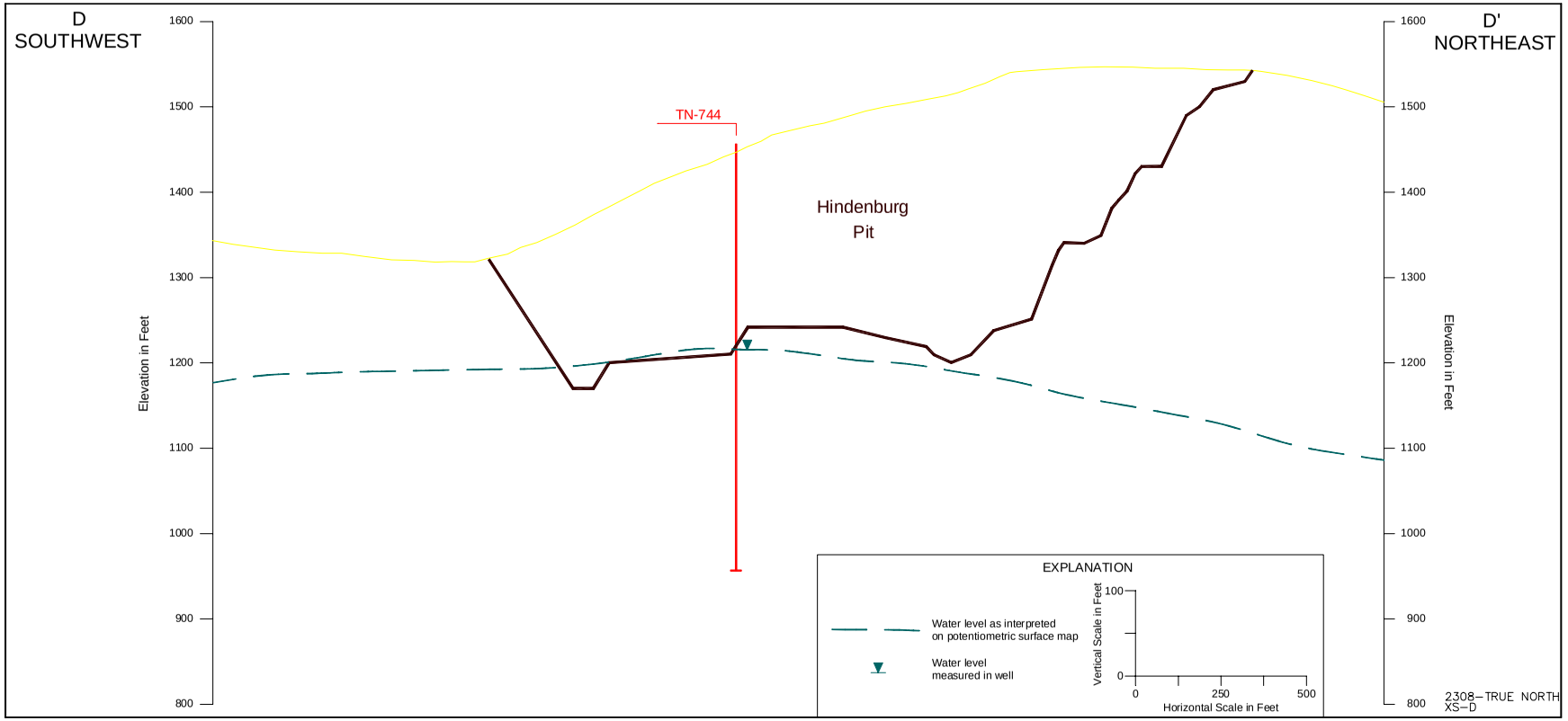
WATER MANAGEMENT CONSULTANTS

Figure 4.3-4 Cross section C-C'



WATER MANAGEMENT CONSULTANTS

Figure 4.3-5 Mine pits cross section D-D'



4.3.3 POTENTIAL FOR INCREASED INFILTRATION TO GROUNDWATER THROUGH THE PITS

The open pits are not expected to penetrate the groundwater table, and no pumping for dewatering would be required. There may be a potential for increased recharge to the groundwater system, however, because the pits would mine through permafrost that currently restricts infiltration of precipitation. Based on the vegetative types covering the pit area, approximately 65 acres, or 47 percent of the pit area, are underlain by some permafrost.

Potential infiltration through the pits to groundwater has been estimated based on the following assumptions:

- The total area encompassing both the Hindenburg and East pits is approximately 138 acres, or 6,000,000 ft^2
- The long-term average precipitation in the project area is approximately 15 in/yr, or 1.25 ft/yr.
- A total of 7,500,000 ft^3/yr of precipitation fall on the pit area.
- Of this amount, a large percentage would be lost to evaporation before it could run off to lower benches within the pit. It is estimated, based on experience at other sites, that a maximum of 40 percent of the total precipitation would reach the lower benches, or approximately 3,000,000 ft^3/yr.
- Of this amount, a large percentage would evaporate or be pumped out of the pits using sumps. It is estimated that a maximum of 5 percent of this water might be available for infiltration. Therefore, a maximum estimate of potential infiltration through the pit is 150,000 ft^3/yr, or approximately 2.1 gpm.

The estimate of 2.1 gpm represents a reasonable estimate based on conservative assumptions. As noted in Section 3.6.2, the estimated flow-through of the system may be as high as 500 gpm, including recharge currently derived from the portions of the pit that are not underlain by permafrost. Therefore, the estimate of 2.1 gpm likely

represents a minimal additional input to the flow system. There likely would be no impact on the overall groundwater flow system given this slight increase in potential flow from increased recharge.

4.4 WATER QUALITY

Based on the acid/base accounting analysis discussed in Section 3.7.3 (Acid Generating Potential), precipitation and the isolated inflows that would contact the exposed rock in the pit walls are not expected to generate acid. The chemical composition of waters recharging the groundwater system from the pits, therefore, is not expected to be any different than the current groundwater chemistry. Thus, no significant chemical impact to groundwater is expected at the site from the potentially increased infiltration through the open pits. Therefore, within the context of the Dome Creek and Little Eldorado Creek drainages, the hydrologic systems within which the mine site is situated, there would be no significant impacts.

4.5 VEGETATION AND WETLANDS

4.5.1 VEGETATION

In this section, vegetation impacts in the mine area are discussed in the context of the whole Dome and Little Eldorado creek drainages because they constitutes the unit encompassing the water, air, soil, and elevation factors that affect vegetative communities. For the access haul road, impacts are discussed in the context of the whole Pedro Creek drainage for the same reason. In these contexts, no significant impacts on plant communities would result from project development.

Table 4.5-1 shows the acreage, by individual vegetation type, that would be disturbed by developing the True North project, excluding the access haul road to the Fort Knox Mill. The community types are the same as described in Section 3.8 (Vegetation).

Table 4.5-1

Approximate area of disturbance to vegetation types expected from development of the True North project, *excluding* the access haul road to the Fort Knox Mill

	Vegetation Type		Area	
Physiography	Level 1	Levels 2–3	Hectares	Acres
Upland	Forest	Needleleaf-closed	9.2	23.3
		Needleleaf-open	31.6	83.6
		Broadleaf-closed	13.4	33.4
		Broadleaf-open	0.3	• 0.5
		Mixed-closed	4.7	11.7
		Mixed-open	4.2	8.5
	Scrub	Tall-open	29.7	74.6
Lowland	Forest	Needleleaf-closed	1.1	3.6
Human Disturbed			2.2	• 5.4
Total Area			96.4	244.7

Source: ABR, 2000b

Approximately 64 percent of the disturbance would occur to two vegetation types – upland needle-leaf open forest 33 percent) and upland scrub tall-open (31 percent). Only one other vegetation type, upland broadleaf-closed forest (14 percent) would account for more than 10 percent of the total disturbed area. Disturbance to these community types would not be significant because they are very common in the project area (Dome and Little Eldorado creek drainages) and throughout the upper Chatanika

River drainage as well as throughout interior Alaska, and the intensity of the impacts would be very small within this context. After the project and reclamation were complete, a major part of the disturbed area is expected to revegetate to these three plant community types, though probably not in the same percentages. Approximation of suitable conditions to encourage vegetation reestablishment on these sites, including soil compaction and soil moisture, would be an important consideration of the reclamation plan.

Approximately 69.4 acres of vegetation would be disturbed along the proposed access haul road alignment, primarily open black spruce forest and black spruce woodlands, but also an open canopy of tall deciduous shrubs and open deciduous forest of aspen in small isolated patches. Disturbance to these community types would not be significant because they are very common in the Pedro Creek drainage and throughout the Goldstream drainage as well as throughout interior Alaska, and the intensity of the impacts would be very small within this context.

4.5.2 WETLANDS

Wetland impacts associated with development of the True North project would include clearing, excavating, and filling forested and scrub-shrub wetlands. Filling activities would include both temporary fills for access roads and permanent fills, including the open pits, development rock and growth medium stockpiles, the maintenance complex, and mine and access haul roads.

During implementation of the True North project, mitigation actions would be taken to avoid and minimize impacts to existing wetlands. Avoidance measures, such as locating facilities and the access haul road outside wetlands where possible, have already been taken in site planning. During project development, sediment-control measures such as the use of hay bales, silt fences, and sediment traps around earth-moving activities and stockpiles would be implemented where surface runoff would flow into otherwise unaffected wetlands. Other measures are listed in Section 2.3.21 (Mitigation).

In this section, wetlands impacts on the mine area are discussed in the context of the whole Dome and Little Eldorado creek drainages because they constitutes the unit encompassing the water, air, soil, and elevation factors that affect wetland communities. For the access haul road, impacts are discussed in the context of the whole Pedro Creek drainage for the same reason. In these contexts, no significant impacts on wetland communities would result from project development.

4.5.2.1. MINE AREA

Table 4.5-2 shows the acreage, by wetland type, that would be disturbed by developing the True North project, *excluding* the access haul road to the Fort Knox Mill. Approximately 65.8 acres of wetlands would be affected by project development. The wetland types are the same as described in Section 3.9 (Wetlands).

Table 4.5-2
Approximate area of disturbance to wetland types expected from development of the True North project, *excluding* the access haul road to the Fort Knox Mill

Wetland Type	NWI Code	Area	
		Hectares	Acres
Dwarf Black Spruce Woodland/ Ericaceous Shrub	PSS 4/3 B	9.8	24.1
	PSS 4 B	0.6	1.5
Black Spruce Forest/Scrub Shrub	PFO/SS 4 B	8.6	21.4
	PFO4/SS 1 B	7.6	18.8
Subtotal: Wetlands Area		26.6	65.8
Subtotal: Uplands	U	72.4	178.9
Total Area		99.0	244.7

Source: ABR, 2000b

Approximately 73 percent of disturbance (179 acres) would occur on uplands. Of the 27 percent of disturbance (66 acres) that would occur on wetlands, approximately 64 percent would occur in the black spruce forest/scrub shrub wetland type (two National

wetland Inventory [NWI] classes: PFO/SS 4 B and PFO4/SS 1 B). The remaining approximately 36 percent would occur in the dwarf black spruce woodland/ericaceous shrub (PSS 3/4 B and PSS 4B) wetland type. Disturbance to these community types would not be significant because they are very common in the project area (Dome and Little Eldorado creek drainages) and throughout the upper Chatanika River drainage as well as throughout interior Alaska, and the intensity of the impacts would be very small within this context. For example, disturbance to the black spruce forest/scrub shrub wetland type would only amount to approximately 2.5 percent of the area of that type found just within the True North claims block. Disturbance to the dwarf black spruce woodland/ericaceous shrub wetland type would amount to less than 1 percent of the area of that type found just within the True North claims block. Also, these wetland types are generally considered low value wetlands. High value wetlands such as emergent marsh, riparian habitats, or open water are not found in the area that would be disturbed by development of this deposit.

4.5.2.2. ACCESS HAUL ROAD

Table 4.5-3 shows the acreage, by wetland type, that would be disturbed by construction of the access haul road to the Fort Knox Mill. Approximately 11.8 acres of wetlands would be disturbed. The wetland types are the same as described in Section 3.9 (Wetlands).

Most of the proposed road alignment, 82 percent, is situated in upland areas (Table 4.5-3). Wetland areas that would be disturbed by the access haul road total approximately 11.8 acres (17 percent) of the potentially disturbed area of 69.4 acres. Disturbance to these wetlands types would not be significant because they are very common in the Pedro Creek drainage and throughout the Goldstream drainage as well as throughout interior Alaska. Also, these wetland types are generally considered low value wetlands. High value wetlands such as emergent marsh, riparian habitats, or open water are not found in the area that would be crossed by the access haul road.

Table 4.5-3

Approximate lengths and areas of wetlands and uplands that would be disturbed by construction of the proposed access haul road to the Fort Knox Mill

		Length		Area	
Wetland Type	**NWI Code**	**(km)**	**(mi)**	**(ha)**	**(acres)**
Open tall alder shrub	PSS/EM1B	0.1	0.1	0.4	1.1
Black spruce woodland	PFO4/EM1B	<0.1	<0.1	0.1	0.3
Open tall birch shrub	PSS3/1B	0.1	0.1	0.3	0.7
Open dwarf black spruce forest	PSS3/4B	0.1	0.1	0.3	0.7
Black spruce woodland	PFO4/SS1B	0.6	1.0	3.3	8.1
Open black spruce forest	PFO4B	<0.1	<0.1	0.1	0.3
Upland/black spruce woodland	U/PFO4/SS1B	<0.1	0.1	0.2	0.6
	Wetlands Subtotal	1.6	1.0	4.8	11.8
Upland	U	7.6	4.7	23.3	57.5
	Project Total	9.2	5.7	28.1	69.4

Source: ABR, 2000a

4.6 FISH

In this section, fish impacts are discussed in the context of the fish and fish habitat in the Dome and Little Eldorado creek drainages (approximately 30 square miles) because these drainages constitute the hydrological unit whose functions affect the fish populations and habitats. In this context, no significant impacts on fish or fish habitat would result from project development. For the access haul road, impacts are discussed in the context of the whole Pedro Creek drainage for the same reason. In these contexts, no significant impacts on fish communities would result from project development.

The location of project operations and disturbance are at a sufficient distance from creeks within the project area that no significant impacts to water quality or flow volumes are expected. Excavation of the mine pits would have no direct impact on creeks. The possibility of a slight increase in groundwater recharge through the open pits might result in a slight increase in groundwater discharge flows to the creeks, but this would be very small in intensity and not be significant (WMCI, 2000). Planned placement of rock and growth medium stockpiles to avoid impacting surface waters, combined with erosion prevention measures, should prevent runoff impacts to creeks.

The access haul road would traverse areas high in the drainages and would cross only small streams. Because of the very small volume of water in the streams that would be crossed, there are no fish in them at those locations. Adequate sizing of culverts to pass natural flows as well as storm runoff would allow water to flow unimpeded to lower reaches that might support fish populations. Proper ditching and stabilization of cut banks and road fill would minimize erosion.

4.7 WILDLIFE

In this section, mine site wildlife impacts are discussed in the context of the wildlife populations and habitat in the Dome and Little Eldorado creek drainages (approximately 30 square miles) and, where the home range of a species is large, adjacent drainages. For the access haul road, impacts are discussed in the context of the whole Pedro Creek drainage for the same reason. In these contexts, wildlife would not be significantly impacted by project development because the habitat types are common in these drainages and throughout the Interior, the affected species are widespread in distribution, or the home range of a species is large when compared to the area that would be impacted.

Three types of wildlife impacts, primarily short-term, would occur from developing and operating the True North project: (1) direct habitat loss, (2) indirect habitat loss (the effective loss of habitat through avoidance because of human contact and associated mining activities and noise), and (3) effects on animal movements (by directly or indirectly altering traditional movement patterns).

The project components, primarily the pits, associated storage piles, and the maintenance complex, would disturb approximately 245 acres. This would constitute approximately 0.02 percent of the Dome and Little Eldorado creek drainages, with the large majority representing direct habitat loss to wildlife during the project's life. An additional approximately 69 acres would be disturbed to construct the access haul road, the large majority of which would be in a different drainage. Some indirect habitat loss would occur during project operation when the effects of noise, movement of equipment, and general human activities cause some animals to simply leave or avoid

surrounding areas. The size and nature of some project components (the open pits, storage piles, and maintenance complex) also would interfere with traditional movement patterns of some species.

After mine closure, the direct loss of some terrestrial habitat likely would become permanent (for example, at the mine pit) for some species. This may be minimized by reclamation. Other areas of direct habitat loss caused by mining operations (such as rock stockpiles) likely would become usable habitat after they were reclaimed. Indirect habitat loss, resulting from avoidance of mining and related human activities, would end. Effects on traditional movement patterns of some species could continue because of the permanent presence of the mine pits. None of the operational or post-closure effects, however, would be significant in the context of the overall Dome and Little Eldorado creek drainages because the affected species and habitats are common and widespread in distribution, or because the affected area is a small part of a species' home range.

4.7.1 BIRDS

Direct habitat loss would occur to passerine species whose small territories and home ranges fall within the project's disturbance footprint. This loss would not be significant, however, because the type of habitat that would be lost is common in the Dome and Little Eldorado creek drainages and throughout the Interior, and the species affected are also widespread. Indirect habitat loss for these species would be negligible because they would adapt to life adjacent to the facilities.

Aside from the Northern Goshawk, discussed in Section 4.8 below, no raptor nests were found during surveys in the True North project area. A few other raptors, however, might be displaced from nesting habitat by direct or indirect habitat loss. It is reasonable to assume that excavating the mine pits would cause some direct habitat loss, or desertion of a nest due to indirect habitat loss. Such losses would be significant only on a local basis because only a few such nests likely would be affected, the individuals might find another nest site in nearby habitat, and these raptor species are common throughout the Interior.

4.7.2 MAMMALS

Direct habitat loss would occur to small mammals whose territories and home ranges fall within the project's disturbance footprint. This loss would not be significant, however, because similar habitat is common in the Dome and Little Eldorado creek drainages and throughout the Interior, as are the species that would be affected. Indirect habitat loss for most species of small mammals would be small because they would adapt to the presence of the facilities. Marten, however, have a low tolerance for human activities and indirect habitat loss for this species likely would occur in the upper Dome and Little Eldorado creek drainages. This would not be significant in the context of the overall Dome and Little Eldorado creek drainages and adjacent drainages throughout which marten are found.

For moose, project development would cause the loss of some upland habitat, but almost no winter habitat would be lost because there would be little disturbance in creek bottoms or floodplains. This habitat loss would be small and not significant in the context of the Dome and Little Eldorado creek drainages. The habitat loss largely would be mitigated by regrowth of preferred hardwood browse species that would occur on stabilized stockpiles once reclamation occurred.

Some indirect habitat loss for moose might occur. It is expected that individual moose usually would avoid the major facilities, but generally would use habitat in areas adjacent to project operations as they do elsewhere in Alaska near human activities.

Both black and brown bears would experience a direct habitat loss, as well as some unpredictable level of indirect habitat loss. Both species likely have already lost some habitat indirectly because of the continuing mining exploration activities, human settlement, and other uses in the project area. Additional indirect habitat loss from the project likely would be marginal, and would cease once operations stopped. These losses would not be significant because of the bears' large home ranges, which include adjacent drainages. Nonetheless, some bears would be displaced to other areas. Brown bears, in particular, seek to avoid human activity and would be affected more heavily than black bears. Black bears, if not attracted by improper garbage disposal or

feeding, also would tend to avoid the area, but they are normally more accommodating to human activity than brown bears. Both species are common throughout the Interior.

The open pits, development rock and growth medium stockpiles, and the maintenance complex would disrupt large-mammal movement patterns to some extent. Because the mine pits and the maintenance complex would not be fenced, some animals, most likely moose, would occasionally wander into these facilities. These animals usually would not be harmed, but probably would need to be herded out by project personnel. In unusual cases, the animals might have to be tranquilized and moved.

The solid waste disposal facilities would be maintained in a manner that would not attract wildlife such as black bears. Putrescible wastes would be stored indoors, or would be stored outdoors in closed containers in a fenced area to prevent access by wildlife. All putrescible refuse would be shipped to the FNSB solid waste landfill. If, however, these procedures were not rigidly adhered to, or if the prohibition against feeding of animals were not strictly enforced, bear/human contacts might occur that would result in serious injury to workers or the death of wildlife.

Movements of mammals largely would be unaffected. Large mammals, such as moose, bears, and wolves, would cross roads easily, but would have to alter their movements to avoid the open pits. This would be a minor impact. Smaller mammals, with smaller home ranges, would be less likely to encounter new project roads, but would have no trouble in crossing them. While any road poses some threat of collision to animals, the generally slow-moving nature of the ore haul trucks would make collisions less likely, especially when compared with the generally accepted risk of collision with normal traffic on the Steese Highway in the same area.

4.7.3 POST-MINING IMPACTS

At completion of the project, implementation of the project reclamation plan (FGMI, 2000b) likely would result in a major portion of the project footprint being returned to wildlife habitat. If the various development rock stockpiles were contoured and revegetated successfully, a substantial portion of the disturbed area would become wildlife habitat. Although likely different from present habitats in several respects, these areas could nonetheless support healthy wildlife populations. Moose could

benefit substantially, especially during the early successional stages of hardwood plant species such as willow, birch, and poplar.

4.8 THREATENED AND ENDANGERED SPECIES AND SPECIES OF CONCERN

4.8.1 THREATENED AND ENDANGERED SPECIES

As noted in Section 3.13 (Threatened and Endangered Species), there are no threatened or endangered species in the True North project area.

4.8.2 SPECIES OF CONCERN

There are four species of concern, and one sensitive species, in the True North project area.

Lynx

The True North project area contains lynx habitat and this species is likely present in fluctuating numbers depending on abundance of prey species. Because lynx generally avoid human activity, the magnitude of the proposed project likely would cause lynx to avoid the area during the life of the project. This would be significant only on a local level. Following mine closure, reclamation, and a return to the proposed post-mining land use of wildlife habitat, lynx likely would be present again in the area over time.

Peregrine Falcon

Because there is no nesting habitat in or near the True North project area, and the nearest nesting peregrines are on the lower Chena River near Moose Creek Dam and on Birch and Beaver creeks, there is no reason to suspect that the project area would be used regularly by migrating falcons for hunting, staging, or as a migration corridor. Therefore, development of the project would not cause any significant impacts to this species.

Northern Goshawk

The True North project area contains habitat for the sensitive Northern Goshawk species, and three active nests were identified there from 1996 to 1998 (Fig. 3.8-1). It is difficult to predict accurately how the proposed project would affect these nests because goshawks occasionally will nest near human activity. It is likely, however, that the nest that was active in 1997, located only approximately 1,000 feet from the edge of a proposed development rock or growth medium storage pile, might not be used for the duration of the project. The nest located approximately 6,500 feet from the edge of the storage pile, would more likely support a nesting pair, but this cannot be predicted. The nest located approximately 16,600 feet from the storage piles likely would not be affected by project activity. These impacts would be significant only on a local basis.

The three nest trees, however, would not be physically disturbed by project activities. Following mine closure, reclamation, and a return to the proposed post-mining land use of wildlife habitat, these nest trees, or others in the area, would be expected to again support active nests within a relatively short period.

Olive-sided Flycatcher

Portions of the True North project area contain good Olive-sided Flycatcher nesting habitat, and several nesting territories were identified. As shown in Figure 3.8-1, two territories are located in areas that would be disturbed by the proposed project pits or stockpiles, and an additional two or three are located within approximately 4,000 feet of such disturbance.

At least two territories would be eliminated by excavation of the mine pits. This would be significant only on a local basis. The other recently identified active territories, at considerably greater distances from project activities, likely would not be affected. Following mine closure, reclamation, and a return to the proposed post-mining land use of wildlife habitat, the presently active territories might again support active nesting, but it likely would take several decades at best, and the topography of the reclaimed mine pits might prevent that from occurring. This impact also would be significant only on a local basis.

Harlequin Duck

Because habitats suitable for Harlequin Ducks do not exist in the True North project area, it is very unlikely this species would occur there. Therefore, development of the project would not cause any significant impacts.

Plants

Because habitats supporting the five plant species of concern do not exist in the True North project area, it is very unlikely these species would occur there. Therefore, development of the project would not cause any significant impacts.

4.9 AIR QUALITY

In this section, air quality impacts are discussed in the context of meeting the NAAQS standards because they provide specific, measurable criteria with which to determine significant impacts. In this context, air quality would not suffer significant impacts from project development.

Because of the project's relatively small size, and because it would have no on-site, point source process facilities, the project would not require an Air Quality Permit to Operate from ADEC. However, any emissions still would have to meet existing air quality standards, particularly for fugitive emissions.

The milling method for this project, to be done at the Fort Knox Mill, has the potential to emit regulated pollutants from certain processes, and fugitive emissions of particulate matter could be released during open-pit mining, as well as during crushing and grinding operations. The application of standard industry procedures, and

adherence to regulatory requirements, would reduce such emissions to insignificant levels. The existing permitted Fort Knox Mill has already met these standards and would continue to do so.

Because power would be purchased from existing GVEA facilities, the only onsite power generation facility would be an approximately 125 kW emergency generator which would produce insignificant emissions during its very infrequent use. The following discussion describes potential sources of pollutants, other than those for the existing permitted Fort Knox Mill facility, and the mitigation to be used to prevent these emissions.

4.9.1 FUGITIVE SOURCES

Several processes potentially could cause particulate matter to be entrained in the atmosphere. By definition, such particulate matter would be considered a fugitive emission because it would not be released from a source such as a stack or chimney. Potential fugitive sources include open-pit mining, vehicle movements on unpaved roads, ore-crushing, and unvegetated rock dump and growth medium stockpiles. Dust particles created from these activities would be relatively large, in contrast to process-type particulate matter emissions. If the larger particles become airborne, they would be expected to settle out in a relatively short distance from their source.

To mitigate the release of fugitive particulates FGMI would use commonly accepted measures. The facility would use a water truck to control dust in the mine pit and on the roads, including the route to the Fort Knox Mill, during dry or windy summer conditions. Chlorides and water would be used to control dust during winter, if necessary. Snow could also be plowed onto the road surface to freeze and cap dust. The overburden and growth medium stockpiles would be stabilized and revegetated as soon as practicable after their creation. Proper application of these measures would result in an insignificant release of fugitive dust.

4.9.2 MOBILE SOURCES

Mobile equipment at the project site would be minor sources of air pollutants. A preliminary list of this equipment is presented in Table 2.2-4. The majority of this

equipment would burn diesel fuel, releasing small quantities of carbon monoxide, particulate matter, nitrogen oxides, and unburned hydrocarbons. The small quantity of this equipment indicates that total emissions would be small and the area in which the equipment would operate would be relatively large. Operation of these mobile sources would not result in significant impacts to ambient air quality.

4.10 NOISE AND VIBRATION

In this section, discussion of noise and vibration impacts are considered in the context of meeting the FHWA roadway noise abatement criteria (Type B) for picnic areas, recreation areas, playgrounds, active sports areas, parks, residences, (exterior) motels, hotels, schools, churches, libraries and hospitals at the nearest public receptors. These criteria are applied because they are widely used in determining traffic noise impacts and provide specific, measurable standards with which to determine significant impacts. There are no state or local noise standards applicable to the project area. In this context, because these standards would no be exceeded, no significant impacts from noise would result from project development. The following analysis is based primarily on Minor & Associates (2000).

4.10.1 POTENTIAL NOISE SOURCES

Noise sources associated with the type of mining process proposed for the True North project include general construction equipment (loaders, trucks, dozers), support equipment (water trucks, compressors, light plants), and blasting-related equipment (rock drills) as well as blasting itself. Noise levels resulting from mining operations, construction equipment, and ore hauling would vary depending on the type of equipment used, the number of concurrent activities, and the distance and topography between the operations and the particular receiver.

Table 4.10-1 provides the reference noise levels for mining equipment to be used for the True North project. The levels were taken from measured noise levels during normal use at actual mining operation or construction sites, or from the EPA (1971b) and other sources. These are the noise levels and numbers of operating equipment used in projecting noise levels at the 15 receiver locations discussed below.

Table 4.10-1
Reference Equipment Noise Levels and Number in Use Simultaneously

Description	Number in Use Simultaneously [1]	Sound Level [2] (individual equipment @ 50 feet)
Bucket Loader (Cat 980 or equivalent)	2	88.8
Haul Trucks, 100 ton	2 to 3 [3]	88.2
Ore Trucks, tractor-trailer	1 to 2 [4]	88.2
Water Truck	1	90.8
Front End Loader	1	80.1
Fork Lift	1	73.1
Dozer (Cat D8/9 or equivalent)	1	92.2
Rock Drill	1	94.8
Compressors, light plants and other small engine powered equipment	4 [5]	73.6

1 Number of pieces in use at the mine site. Does not include trucks off site hauling ore to the Fort Knox Mill.
2 Each piece of equipment under normal operation as measured at a distance of 50 feet.
3 Predictions assume trucks in use and idling, with three total trucks available at the mine site.
4 Predictions assume 1 to 2 trucks in operation, and 1 to 2 trucks idling at the site in staging or waiting to be loaded with ore.
5 Assumes mixture of compressors, light plants, small engine powered generators, welders and other operational and maintenance equipment. This is a minimal component of sound during normal operations.

Blasting

Mining operations at True North usually would involve one, but occasionally as many as three, blasts per day, five days a week. These would occur within a short time span, usually less than 40 minutes, at approximately 3:00 PM. Blasting of the type expected to take place at the True North Mine would result in maximum sound levels of 125 dBC at 100 feet or 105 dBC at 1,000 feet.

4.10.2 NOISE REGULATIONS AND STANDARDS

This section contains information on the noise standards and regulations that were used for evaluation of potential impacts associated with the True North project. Included are the FHWA traffic noise criteria and the EPA guidelines for community noise and noise related to blasting. These criteria are used because they provide specific, measurable standards with which to determine impacts.

For reference, Table 4.10-2 shows sound levels for some common noise sources and compares their relative loudness to that of an 80 dBA source such as a garbage disposal or food blender.

Table 4.10-2-
Sound Levels and Relative Loudness of Typical Noise Sources found in Indoor and Outdoor Environments

Noise Source or Activity	Sound Level (dBA)	Subjective Impression	Relative Loudness (human judgment of diff. sound levels)
Jet aircraft takeoff from carrier (50 ft)	140	Threshold of pain	64 times as loud
50-hp siren (100 ft)	130		32 times as loud
Loud rock concert near stage Jet takeoff (200 ft)	120	Uncomfortably loud	16 times as loud
Float plane takeoff (100 ft)	110		8 times as loud
Jet takeoff (2,000 ft)	100	Very loud	4 times as loud
Heavy truck or motorcycle (25 ft)	90		2 times as loud
Garbage disposal, food blender (2 ft), Pneumatic drill (50 ft)	80	Moderately loud	Reference loudness
Vacuum cleaner (10 ft) Passenger car at 65 mph (25 ft)	70		1/2 as loud
Large store air-conditioning unit (20 ft)	60		1/4 as loud
Light auto traffic (100 ft)	50	Quiet	1/8 as loud
Bedroom or quiet living room Bird calls	40		1/16 as loud
Quiet library, soft whisper (15 ft)	30	Very quiet	
High quality recording studio	20		
Acoustic Test Chamber	10	Just audible	
	0	Threshold of hearing	

Sources: Beranek (1988) and EPA (1971)

4.10.3 FHWA TRAFFIC NOISE CRITERIA

The traffic noise impact criteria for federal funded road and highway projects are taken from Title 23 of the *Code of Federal Regulations* (CFR) Part 772, Procedures for Abatement of Highway Traffic Noise and Construction Noise, FHWA. The criterion applicable for residences, churches, schools, recreational uses, and similar areas is an exterior hourly equivalent sound level (L_{eq}) from the project that approaches or exceeds 67 dBA. The criterion applicable for other developed lands, such as commercial and industrial uses, is an exterior L_{eq} that approaches or exceeds 72 dBA. No criterion exists for underdeveloped lands or construction noise. A summary of the FHWA noise regulations is contained in Table 4.10-3.

Table 4.10-3
FHWA Roadway Noise Abatement Criteria

Land Use Category		Hourly Leq (dBA)
Type A	Lands on which serenity and quiet are of extraordinary significance and serve an important public need and where the preservation of those qualities is essential if the area is to continue to serve its intended purpose	57 (exterior)
Type B	Picnic areas, recreation areas, playgrounds, active sports areas, parks, residences, (exterior) motels, hotels, schools, churches, libraries and hospitals	67 (exterior)
Type C	Developed lands, properties or activities not included in the above categories	72 (exterior)
Type D	Undeveloped land	--
Type E	Residences, motels, hotels, public meeting rooms, schools, churches, libraries, hospitals and auditoriums	52 (interior)

4.10.4 EPA NOISE INCREASE GUIDELINES

Table 4.10-4 contains the EPA standards that can be used as a guideline for expected community reaction to a noise increase above existing ambient levels.

Table 4.10-4
EPA Guidelines for Expected Noise Increase Impact

Increase in Noise over Existing Level	Expected Community Reaction
0 - 5 dBA	Few complaints if gradual increase
5 - 10 dBA	More complaints, especially if conflicts with sleeping hours
Over 10 dBA	Substantial number of complaints

4.10.5 BLASTING NOISE AND NOISE LEVEL DESCRIPTORS

Evaluation of blast noise was performed using the C-weighting scale. For short-term and impulsive noises, such as surface blasting, the C-weighted filter is normally used. The C-weighted filter helps to account for the short time period and low frequency content characteristic of blasting. Measurements taken with the C-weighting filter are denoted dBC. Table 4.10-5 provides information on blasting, blast levels in dBC and community response based on the number and relative sound level of the blast.

Table 4.10-5
EPA Limits on Number of Blasts for Different Blast Levels

Blast Level in dBC	Permissible Daily Number
Above 125	0
123 - 125	1
121 - 122	2
120	3
119	4
118	5
117	6
116	8
115	10
114	12
113	16
112	20
111	25
110	32
109	40
108	51
107	64
106	80
105	100

4.10.6 PROJECT NOISE AND VIBRATION IMPACT CRITERIA

Using the EPA and FHWA noise regulations and standards described above in Section 4.10.2, the following noise criteria were developed for analysis of this project to protect the health and welfare of noise sensitive land uses near the proposed mine site and access haul road corridor.

4.10.7 NOISE IMPACT CRITERIA

For the purpose of performing the noise impact analysis, 15 receivers were selected as representative for operational noise and 12 receivers were selected as representative for potential noise related to the proposed access haul route. The severity of noise impacts will be determined by the project related increase over the existing average ambient noise level and the project related energy average hourly noise level (L_{eq}), at each representative receiver location. As previously stated, human sensitivity to

changes in noise levels will vary depending on certain conditions. Normally, the smallest change in ambient (broadband) noise levels that a human ear can perceive is about 3 dBA. Increases of 5 to 7 dBA or more in noise are usually noticeable to most people, and a 10-dBA change is judged by most people as a doubling of the sound level. Given this information, the measured existing noise levels and information from the EPA and US Bureau of Mines the impact criteria derived for the project are given in Table 4.10-6.

Table 4.10-6
Significance of Noise Impacts

Generally Not Significant	Possibly Significant	Generally Significant
No noise-sensitive sites are located in the project area or the increase in noise levels with implementation of the project are projected to be less than 3 dBA at noise sensitive sites	Increases in noise levels with implementation of the project are expected to be between 3 dBA and 10 dBA, and the overall project related hourly average noise level does not exceed 50 dBA L_{eq}. Determination of significance will also consider existing noise levels and the presence of noise-sensitive sites.	Project would cause an increase in the existing noise levels of over 10 dBA, and overall project related hourly average noise levels of over 55 dBA L_{eq}. Determination of significance will also consider existing noise levels and the presence of noise-sensitive sites.

In addition to the criteria given in Table 4.10-6, noise sensitive receivers along the proposed access haul route that exceed the FHWA impact criteria given in Table 4.10-

3, or that have a 10 dBA L_{eq} increase in hourly noise levels related to the project, also would be considered as having a significant traffic noise impact.

4.10.8 VIBRATION IMPACT CRITERIA

There are no existing vibration criteria applicable to the proposed Project. Estimates of expected vibration levels are used since vibration readings are dependent on the source of vibration, transmitting medium and distance from the vibration source. For the purpose of this report, vibration impacts will include those that may interrupt normal living or working conditions at sensitive receptors located close to the facility, or those that may cause structural damage to nearby buildings or environment. Separate vibration criteria were developed for blasting and other vibration producing activities, such as general operation of the mine and mine related traffic.

Vibration from mining related activities, such as mechanical digging, rock breaking and vehicle traffic are only expected to be perceptible within a few hundred feet of the activity, and no impacts are expected. However, criteria were developed for the project to assure that there would not be any vibration related impacts. The vibration criteria are derived from the US Department of Transportation (USDOT) guidelines for the evaluation of impacts due to vibration. The criteria are given in Table 4.10-7. These criteria are not applicable to blasting due to the short duration and lower frequency associated with blasts. Vibration levels from general operation and traffic do not have the same level of annoyance as the vibration produced from blasting.

Table 4.10-7

General Vibration Peak Particle Velocity Guidelines

Velocity (in/sec)	Effects on Humans	Effects on Building
0 to 0.01	Imperceptible by people--no intrusion.	Vibrations unlikely to cause damage of any type.
0.04 to 0.08	Threshold of perception--possibility of intrusion.	Vibrations unlikely to cause damage of any type.
0.15	Vibrations perceptible.	Recommended upper level of the vibration to which ruins and ancient monuments should be subjected.
0.64	Level at which continuous vibrations begin to annoy people.	Virtually no risk of "architectural" damage to normal buildings.
1.27	Vibrations annoying to people in buildings (this agrees with the levels established for people standing on bridges and subjected to relatively short periods of vibrations).	Threshold at which there is a risk of "architectural" damage to normal dwellings - houses with plastered ceilings and walls.
2.54 to 3.81	Vibrations considered unpleasant by people subjected to continuous vibrations and unacceptable to some people walking on bridges.	Vibrations at a greater level than normally expected from traffic, but would cause "architectural" damage and possible minor structural damage.

The US Bureau of Mines (BOM, 1971) defines a vibration blasting criterion. The safe blasting vibration criterion is given in terms of particle velocity in inches-per-second at the frequency where most blasting energy is normally located (approximately 40 Hz). The level of vibration considered the threshold of the “safe blasting criteria” is 2.0 inches-per-second. Table 4.10-8 lists the blasting vibration criteria used to analyze the proposed True North mining operation.

Table 4.10-8
Significance of Blasting Vibration Impacts

Generally Not Significant	Possibly Significant	Generally Significant
No vibration-sensitive sites are located in the project area or the increase in vibration levels with implementation of the project remain below 0.5 in/sec at vibration sensitive sites	Increases in vibration levels during blasting are between 0.5 in/sec and 2.0 in/sec. Determination of significance will also consider existing noise levels and the presence of noise-sensitive sites.	Proposed project would cause an increase in the vibration levels during blasting of greater than 2.0 in/sec.

4.10.9 NOISE ANALYSIS PROCESS

This section describes how operational noise levels were predicted, and how the impact analysis was made. The project area was examined for existing sensitive receivers located within approximately 4 to 5 miles of the proposed mine site, or within 2000 feet of a potential access haul route. Fifteen receiver locations were selected to represent nearby noise sensitive residential neighborhoods for operational noise from the True North Mine site. An additional twelve receiver locations, discussed in section 4.10.6 (Traffic Analysis), were selected for a separate noise analysis related to the proposed access haul route**.**

Operational noise level projections were performed using the methods described in the EPA (1971b) in addition to information from other acoustical sources related to the type of expected noise producing activities. Reference noise levels for equipment were taken from the same EPA document, or from the actual measured noise level of equipment in use at actual construction sites or mining operations. The reference levels are given in the following section. Traffic noise levels are predicted using the FHWA traffic noise prediction model (FHWA, 1998). Input data to the model are provided below.

Atmospheric Conditions Used in the Analysis

In most areas temperature and other changes in atmospheric conditions will have a minimal effect on the transmission of noise. However, because of the extreme changes in atmospheric conditions and ground cover in the project area, several different calculations were performed to simulate the changing conditions and project noise levels for the impact analysis. Information on the temperature, ground cover, and humidity were taken from information posted by the Fairbanks National Weather Service on average climatic data taken between 1961 and 1990. This information was used to establish three average conditions that were used in the analysis. Summary information of atmospheric and ground cover information used in the analysis is given in **Table 4.10-9.**

Table 4.10-9.
Atmospheric and Ground Cover Information by Season[1]

Season[2]	Ground Cover	Max Temp[3]	Min Temp[4]	Humidity[5]
Winter (Late November – February)	Powder Snow	0	-20	20
Spring/Fall (March – May & September – Mid November)	Granular Snow	45	28	50
Summer (June – September)	Field Grass	70	50	70

Complete data on temperature, precipitation and chance of precipitation given in Appendix D.

Some overlap was used to better approximate the seasonal changes and conditions.

Average maximum temperature during the specified months.

Averaged minimum temperature during the specified months.

Humidity based on averaged daily mean precipitation, snowfall and chance of precipitation.

Operational Noise Levels

Noise levels at each selected receiver location were projected by logarithmically summing the individual noise level for each piece of equipment expected to be in use at the mine site, with appropriate noise level corrections. Acoustical corrections used in the analysis include: number of pieces of equipment in operation (i.e., number of ore trucks in concurrent operation); distance; topography; level of use (i.e., minutes per hour the piece of equipment would be used); foliage; temperature; physical shielding; and mitigation measures such as noise barriers. Because of the varying level of foliage and temperature changes in the area, three sets of noise level calculations were performed. All three-analysis scenarios assume the shortest distance to the mining operations from the receiver location. The calculation scenarios are described in detail below.

Scenario 1: Average or nominal noise level calculations. Scenario 1 assumes average temperatures and some foliage reduction with no additional noise reduction due to topography or shielding, such as berms. This calculation scenario, which is representative of transitional months such as the spring and fall months, would occur frequently during summer and some winter months. Scenario 1 conditions, considered the nominal and most common condition, are projected to occur 50 to 60 percent of the time.

Scenario 2: Minimum noise level calculations. Scenario 2 assumes normal noise reductions for foliage and average to moderate temperatures. This calculation would be most representative of summer months. Scenario 2 conditions are projected to occur 20 to 30 percent of the time.

Scenario 3: Maximum noise level calculations. This calculation scenario would be most representative of coldest winter months when temperatures are at and below zero degrees Fahrenheit and noise transmission is at maximum. Under this scenario, only a minimal noise reductions related to foliage was applied, and no reductions were assumed for topography or shielding. In addition, because of the higher level of noise transmission, the ambient noise levels were also increased by 3 dBA. Scenario 3 conditions are projected to occur less than 20 percent of the time.

All calculations assume the same amount of mine related equipment in operation. In addition, in order to perform a conservative calculation, no additional noise reductions were assumed for existing or constructed berms or ore stockpiles. Given these safety factors, the projected noise levels can be considered the “worst case” noise levels to be produced at the site.

4.10.10 Traffic Noise Modeling Methods

For areas that could experience an increase in noise levels related to ore hauling, the FHWA (1998) traffic model was used to predict traffic noise levels. Input to the model included number of vehicles per hour (broken into three vehicle classes), average travel speed, ground conditions, temperature, humidity, and general roadway, receiver and area topographical information. Vehicle classification used in the analysis was passenger vehicles, medium trucks such as delivery trucks, and heavy trucks such as the proposed ore trucks and existing tractor-trailers currently serving Fort Knox. For passenger vehicles and medium trucks, the noise model used national average measurements for the noise level predictions. Ore truck noise levels used in the analysis were measured noise levels taken on a similar truck along Fairbanks Creek Road on Monday, July 10, 2000.

4.10.11 Reference Equipment Noise Levels

Where ever possible, the noise levels used in the analysis were actual measured noise levels of similar equipment during the types of operations expected at the True North Mine site. In addition to noise levels of the general equipment located at the mine site, pass-by measurements were taken of an ore truck under several different operational conditions along Fairbanks Creek Road. The measured data from the pass-by measurements was normalized and used in the traffic noise analysis. The following sections provide the reference levels used in the analysis.

Reference Noise Levels for Mine Site Equipment

Table 4.10-10 provides the reference noise levels used in the calculations. The levels were taken from measured noise levels during normal use at actual mining operation or construction sites, or from the EPA and other sources. These are the noise levels and numbers of operating equipment used in projecting normal operational noise levels at sensitive receiver locations.

Table 4.10-10
Reference Equipment Noise Levels and Number in Use Simultaneously

Description	Number in Use Simultaneously[1]	Sound Level[2] (individual equipment @ 50 feet)
Bucket Loader (cat 992 or equivalent)	2	88.8
Ore trucks, 100 ton	2 to 3[3]	88.2
Ore Trucks, tractor-trailer	1 to 2[4]	88.2
Water Truck	1	90.8
Front End Loader	1[5]	80.1
Fork Lift	1	73.1
Dozer (D10N)	1	92.2
Rock Drill (DM45)	1	94.8
Compressors, light plants and other small engine powered equipment	4[6]	73.6

Number of equipment pieces in use at the proposed mine site. (Does not include trucks off- site hauling ore to Fort Knox).

Each piece of equipment under normal operation as measured at a distance of 50-feet.

Predictions assume trucks in use and idling, with three total trucks available at the mine site.

Predictions assume 1 to 2 trucks in operation, and 1 to 2 trucks idling at the site in staging or waiting to be loaded with ore (8 trucks total in use).

The 988 will serve as both a front end loader and a fork lift.

Predictions assume a mixture of compressors, light plants, small engine powered generators, welders and other operational and maintenance equipments. This is a minimal component of sound under normal operation.

4.10.12 REFERENCE ORE TRUCK NOISE LEVELS AND PASS-BY MEASUREMENTS

Reference ore truck pass-by measurements were made using an ore truck of similar engine horsepower and size as the proposed project ore haul trucks. The measurements were taken on July 10, 2000 under normal summertime atmospheric conditions with a slight wind (5 to 10 mph) blowing to the east-northeast. The measurements were made in accordance with FHWA and ANSI standards for pass-by measurements. Because of the relative close proximity of the measurement equipment (50 and 100 feet from the travel lane), varying atmospheric conditions would have little to no affect on the transmission of the truck noise. Figure 4.10-1 is a diagram of the test setup, location of the monitoring equipment, and ore truck travel route.

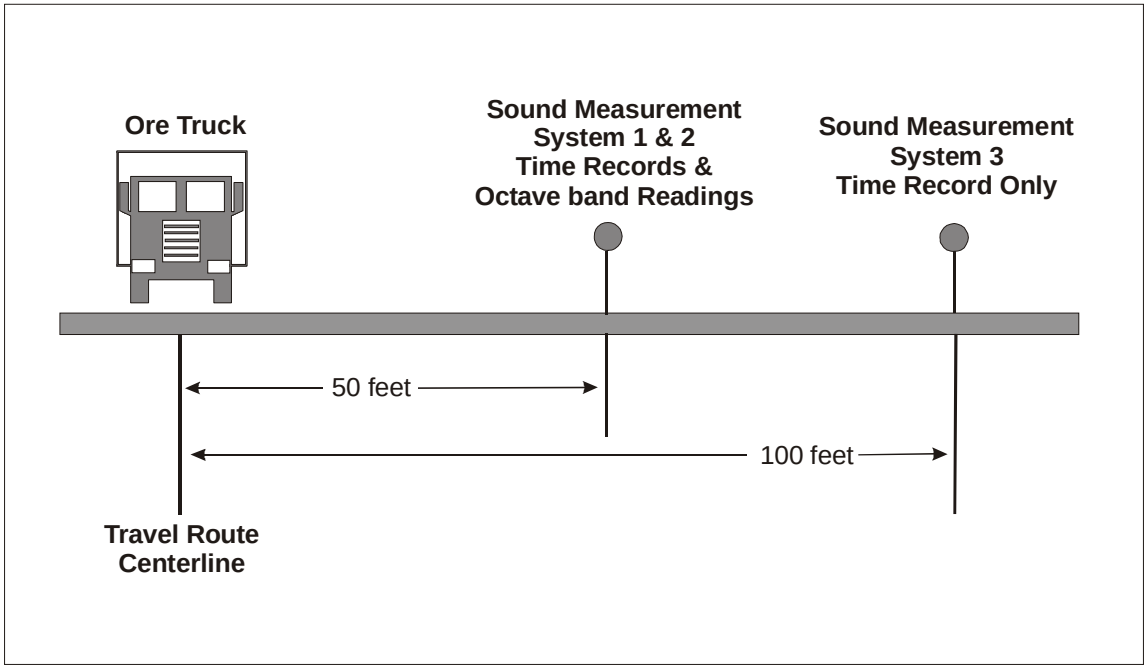


Figure 4.10-1

Pass-by Measurement Diagram

Several pass-by noise level measurements were taken under different travel conditions, including normal hauling with a full load, normal hauling without a load, pulling a hill in low gear with a full load, normal and loaded acceleration, and standing normal and maximum engine idle measurements. The measured noise levels were grouped by pass-by characteristics, and normalized maximum sound levels were developed for six representative operational conditions. Figure 4.10-2 is a graph of the normalized six pass-by measurements at distances of 50 and 100 feet from the centerline of the haul route. The six tests were grouped together for ease of presentation. Table 4.10-11 contains the details on the operational characteristics for each of the tests with the maximum noise levels measured at each distance.

Figure 4.10-2 Pass-By Noise Level Measurements

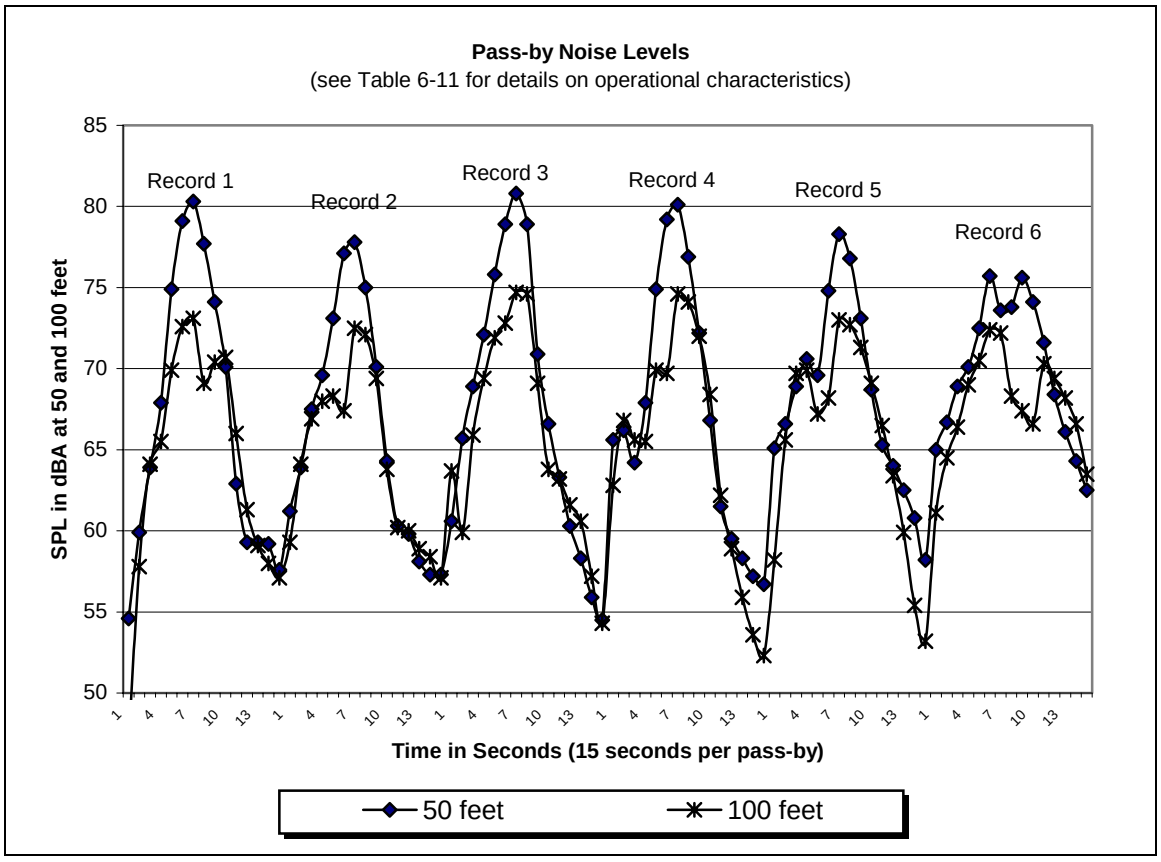


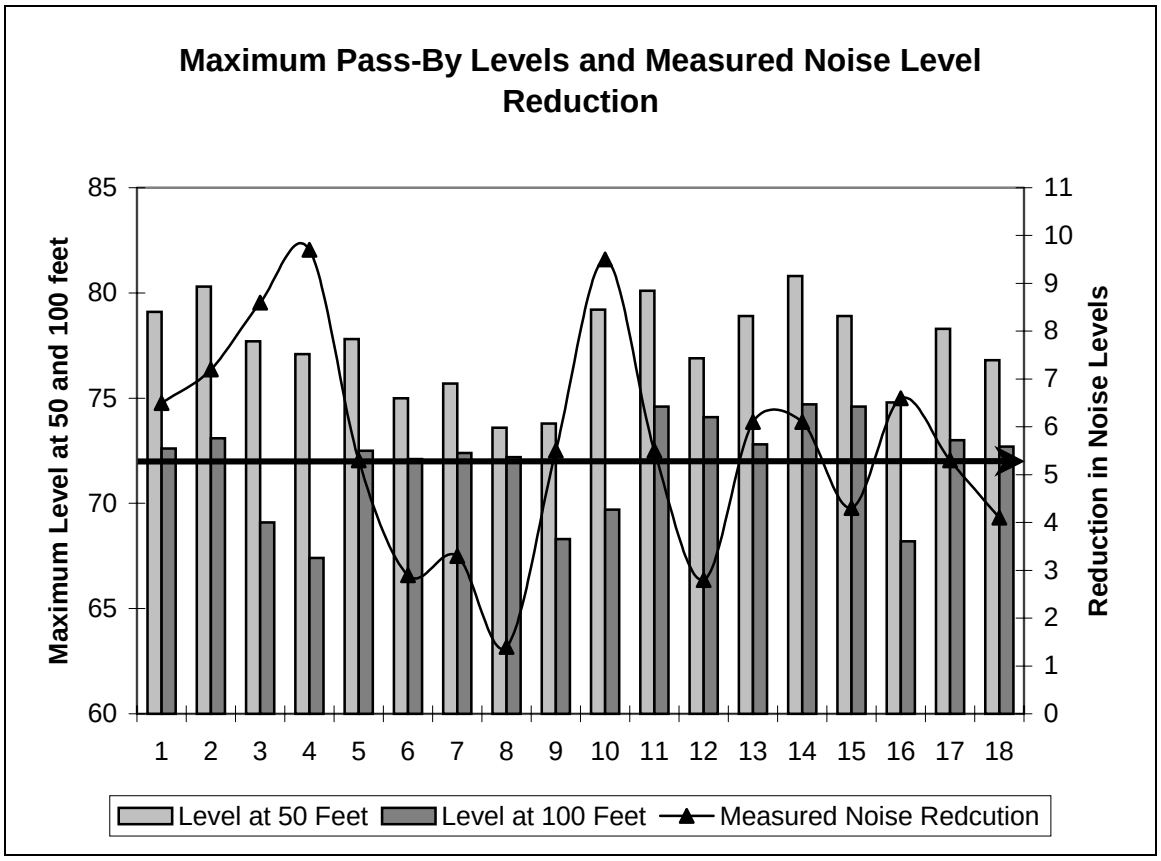
Table 4.10-11
Ore Truck Operational Characteristics and Normalized Pass By Levels[1]

Test[2]	Operational Characteristics	Sound Level Information		
		50 ft[3]	100 ft[3]	Reduction[4]
1	Normal Operation – Loaded	80.3	73.1	7.2
2	Normal Operation – Unloaded	77.8	72.5	5.3
3	Acceleration – Loaded	80.8	74.7	6.1
4	Acceleration – Unloaded	80.1	74.6	5.5
5	Quiet Pass-by – Loaded (with gear change)	78.3	73	5.3
6	Quiet Pass-by – Unloaded (with gear change)	75.7	72.4	3.3

1. See Figure 6-3 for test setup
2. See Figure 6-4 for measured data
3. Normalized maximum sound for given operational characteristics
4. Measured reduction in noise level between the two monitoring location

The pass-by measurements also were used to verify the nominal near field noise reduction characteristics of a typical ore truck. Figure 4.10-3 contains a bar graph of the highest measured levels of the representative pass-bys given in Figure 4.10-2. The figure also contains the noise level reduction between the 50 foot and 100 foot measurement and a calculated overall average with the highest and lowest values removed. The projected nominal noise level reduction was calculated at 5.5 to 5.7 dBA, or 1 dBA higher than the 4.5 dBA used by the FHWA. The higher reduction obtained in the testing is due to the single vehicle pass-by being somewhat closer to a point noise source than the 4.5 dBA reduction associated with steady flowing traffic along a roadway. However, in order to maintain a conservative analysis, the FHWA 4.5 dBA noise reduction characteristic was used in the traffic noise analysis.

Figure 4.10-3 Maximum Pass-By Noise Levels and Noise Reduction Factors



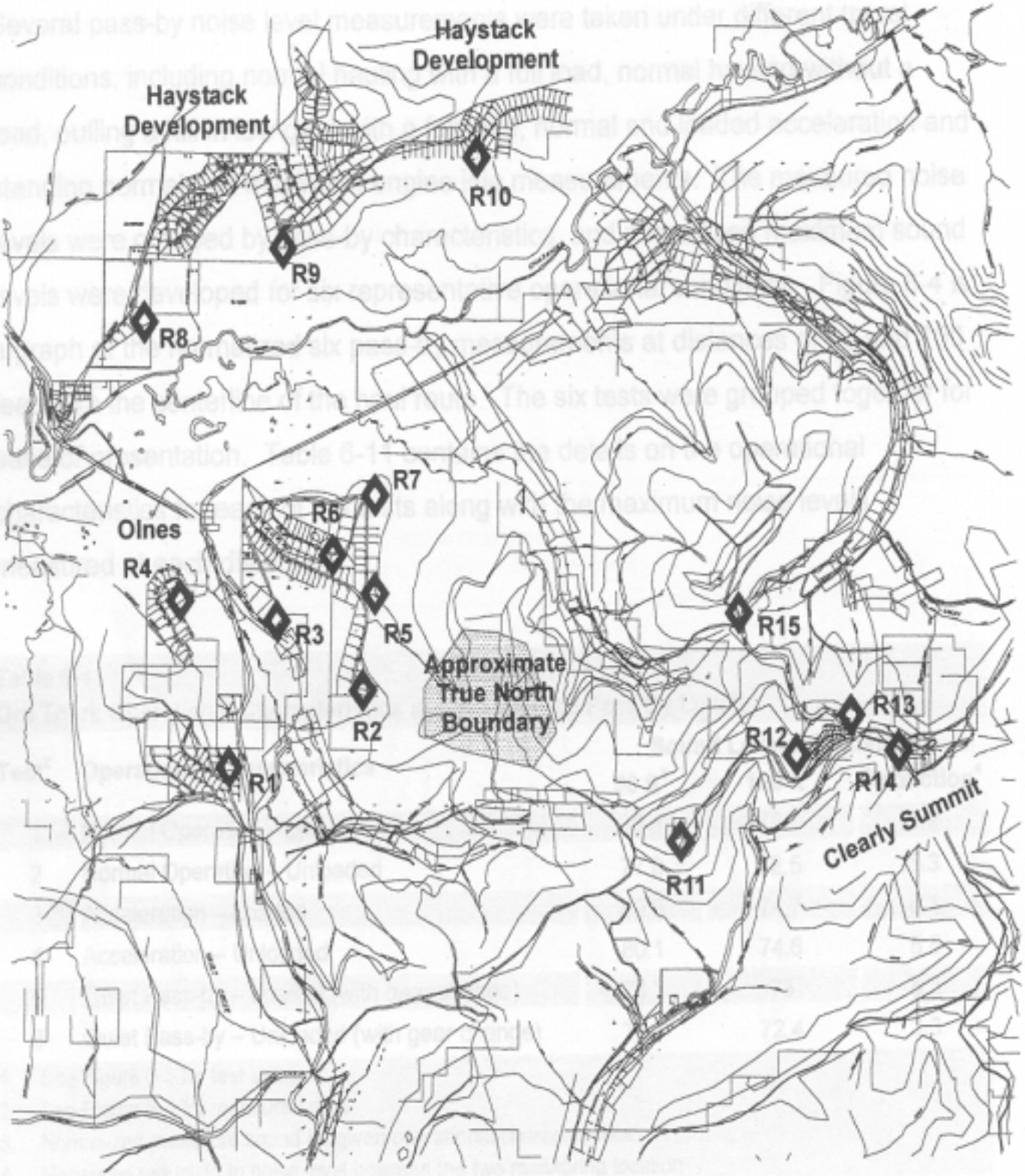
4.10.13 MINE OPERATION ANALYSIS

The noise impact analysis was performed in three parts: 1) True North operations analysis for noise at the mine site (Section 4.10.5); 2) haul route noise related to ore trucks moving ore between the True North Mine site and the Fort Knox Mill (Section 4.10.6); and, 3) a cumulative analysis of all associated noise related from the project, where appropriate (Section 4.10.7). Details on the noise calculations and results are given below, with separate discussions for each of the potentially affected residential subdivisions.

Noise levels related to mine site operations were projected at 15 representative receiver locations within 4 to 5 miles of the proposed site. In addition to general operational noise, access haul route calculations also were performed. Figure 4.10-4 provides an overview of the receiver locations for operational impact analysis.

Table 4.10-12 provides a summary of the project related noise level at each receiver location. In addition, brief descriptions of each of the receiver locations along with a general discussion of the predicted noise levels are given in the following paragraphs.

For the purpose of discussing potential noise levels and performing an impact analysis, the study area was divided in to three areas: Olnes, Haystack, and Pedro Dome/Cleary Summit. Operational noise levels at each of the areas are described in detail in the following sections. The discussion includes comparisons of the daytime and nighttime noise levels, for the existing conditions, future conditions with mining operations, and the projected difference at each of the 15 representative locations. An additional analysis of traffic noise and noise related to blasting is included where applicable. Because all residential areas are greater than 5000 feet from the mine site, no vibration impacts are projected.



Title:

Mine Site Operations Receiver Locations

Figure:

4.10-4

Table 4.10-12

Summary of True North Operational Noise Levels[1]

Receiver Notation	Location Description[2]	Dist to Site in feet[3]	Project noise levels[4]		
			Max	Avg	Min
R1	Lot 2 on Wildcat Creek Way, just west of the Elliott Hwy., in the Olnes subdivision	15,589	39.5	32.2	29.5
R2	Lot 1 on Eli Avenue at the south end of Simpson Way, in the Olnes subdivision	6,737	47.6	41.5	39.1
R3	Southern most lot on the Old Elliott Hwy at the turn leading to Luneberg Road	10,690	43.1	36.4	33.8
R4	Lot 12 on Treasure St, east of the Elliott Hwy., in the Olnes subdivision	16,224	39.1	31.8	29.0
R5	Lot 8 on Luneberg Rd., in the Olnes subdivision, closest residential use to the site	5,503	49.6	43.7	41.5
R6	Lot 12 on Olnes Loop Rd. in the Olnes subdivision	7,510	46.6	40.3	37.9
R7	Lot 14 on Luneberg Rd., the northern most lot in the Olnes subdivision	7,560	46.5	40.2	37.8
R8	Lot 5 in the Haystack Ridge Subdivision (TL-1) on Haystack Drive, 4,300 feet south of the Cogan Drive "Y" intersection	18,827	37.6	30.1	27.3
R9	Lot 10 on Leuthold Dr., just south of the Haystack Dr./ Leuthold Dr. intersection	19,209	37.4	29.9	27.1
R10	Lot 7 in the Haystack Extension Gl-2, on Leuthold Dr., northern most site in the analysis	19,901	37.1	29.5	26.7
R11	Pedro Dome Road - at the end of the roadway at the communication tower (for reference)	14,359	32.2	31.2	31.1
R12	Lot 2 on the northwest corner of Ridge Run Rd., northwest of Pedro Dome Rd.	17,663	30.3	29.3	25.3
R13	Lot 16, at the northwest corner of Rock Run Rd. west of the Steese Hwy	18,447	29.9	28.9	24.8
R14	On Skiland Rd., west of the SKILAND Resort near the residential land use.	22,747	27.9	26.8	22.7
R15	Along the Steese Hwy., north of Cleary Summit approximately 2 miles	12,140	33.7	32.7	28.9

Noise levels from True North operations as projected at representative receiver locations

Location and lot information obtained from CAD drawings provided by the City of Fairbanks

Distances were measured on CAD drawings provided by the City of Fairbanks.

Noise levels given are for project related noise only, and were calculated for 3 different scenarios previously described. All scenarios assume no shielding or additional mitigation.

4.10.14 OLNES RESIDENTIAL SUBDIVISIONS NOISE LEVELS

There were seven receiver locations in the Olnes area. Distances from the proposed True North Mine site to the Olnes Subdivision ranged from approximately 5500 feet to over 16000 feet. The seven receivers represent residences located in Wanda's Acres, the Olnes East Subdivision and the Olnes West Subdivision. The sites, numbered R1 through R7 are shown on Figure 4.10-4.

R1: Site R1 is at Lot 2 on Wildcat Way, approximately 750 feet east of the Elliott Highway. The site is west – southwest of the mining operation approximately 15,600 feet and is not projected to have noise impacts under any of the noise level calculation scenarios. Average noise levels with operation or the True North Mine are expected to increase by less than 1.6 dBA under any of the noise calculation scenarios. Under normal conditions, operation of the mine is not expected to be audible at this site, or the other nearby surrounding homes. Table 4.10-13 provides a summary of the noise levels and noise level increases for each calculation scenario.

Table 4.10-13
Receiver R1 Noise Level Calculation Results

Calculation Scenario[1]	Existing[2]		Future		Change	
	Day	Night	Day	Night	Day	Night
Scenario 1	50	40	50.1	40.7	0.1	0.7
Scenario 2	50	40	50.0	40.4	0.0	0.4
Scenario 3	53	43	53.2	44.6	0.2	1.6

See "Operational Noise Levels" for details on the calculation scenarios.
Existing conditions projected from monitoring locations M5 and M2 with 3 dBA added during periods of maximum sound transmission

R2: Site R2 is located at Lot 1 in the southern end of the Olnes East Subdivision on Eli Avenue east of Simpson Way. The site is directly west of the True North Project site approximately 6,700feet. Under normal operational conditions, future noise levels are projected to increase by approximately 4 dBA during daytime hours and 7 dBA during

the nighttime. Increases during scenario 2 conditions are 2.6 dBA during daytime and 5.6 during the night. Under this scenario, which is projected to occur less than 10 percent of the time, noise level increases of up to 10 dBA can be expected during the nighttime with increase of 6 dBA during the daytime. No impacts are projected in the vicinity of this location because the future noise levels are not projected to exceed 50 dBA under any of the scenarios. Table 4.10-14 provides a summary of the noise levels and noise level increases for each calculation scenario.

Table 4.10-14
Receiver R2 Noise Level Calculation Results

Calculation Scenario[1]	Existing[2]		Future		Change	
	Day	Night	Day	Night	Day	Night
Scenario 1	40	35	43.8	42.4	3.8	7.4
Scenario 2	40	35	42.6	40.6	2.6	5.6
Scenario 3	43	38	48.9	44.6	5.9	10.1

See "Operational Noise Levels" for details on the calculation scenarios.
Existing conditions projected from monitoring location M5 with 3 dBA added during periods of maximum sound transmission

R3: Site R3 is also located in Olnes East. The Site is one of the southernmost along the Old Elliott Hwy., just before the connection to Luneberg Rd. This site is west of the mining site approximately 10,600-feet, and is projected to have noise level increases of 0.3 to 1.2 dBA during daytime hours, and 1.4 to 4.2 during the nighttime. Maximum future noise levels during the daytime are projected at 49.2 dBA Leq. No impacts are projected at this location or other nearby surrounding homes. Table 4.10-15 provides a summary of the noise levels and noise level increases for each calculation scenario.

Table 4.10-15
Receiver R3 Noise Level Calculation Results

Calculation Scenario[1]	Existing[2]		Future		Change	
	Day	Night7	Day	Night	Day	Night
Scenario 1	45	38	45.6	40.3	0.6	2.3
Scenario 2	45	38	45.3	39.4	0.3	1.4
Scenario 3	48	41	49.2	45.2	1.2	4.2

See "Operational Noise Levels" for details on the calculation scenarios.
Existing conditions projected from monitoring locations M5 and M2 with 3 dBA added during periods of maximum sound transmission

R4: Site R4 is in the Olnes west subdivision near lot 12 on the west side of Treasure Street. The site is approximately 16,200-feet west of the project location. No impacts are projected at this receiver or other homes in Olnes west due to the large distance to the project. Table 4.10-16 provides a summary of the noise levels and noise level increases for each calculation scenario.

Table 4.10-16
Receiver R4 Noise Level Calculation Results

Calculation Scenario[1]	Existing[2]		Future		Change	
	Day	Night	Day	Night	Day	Night
Scenario 1	45	38	45.2	38.9	0.2	0.9
Scenario 2	45	38	45.1	38.5	0.1	0.5
Scenario 3	48	41	48.5	43.1	0.5	2.1

See "Operational Noise Levels" for details on the calculation scenarios.
Existing conditions projected from monitoring locations M5 and M2 with 3 dBA added during periods of maximum sound transmission

R5: Site R5 is in the Olnes east Subdivision and is one of the closest residential lots to the project site at an estimated distance of 5,500 feet. The site is east of Luneberg Rd. near the Luneberg Rd. – Simpson Way intersection, at lot 8. Under scenario 3 there is a slight potential for noise impact during both daytime and nighttime hours. Daytime noise levels of 50.5 dBA and increases of over 10 dBA during the nighttime could potentially occur under ideal conditions. Table 4.10-17 provides a summary of the noise levels and noise level increases for each calculation scenario.

Table 4.10-17
Receiver R5 Noise Level Calculation Results

Calculation Scenario[1]	Existing[2]		Future		Change	
	Day	Night	Day	Night	Day	Night
Scenario 1	40	35	45.3	44.3	5.3	9.3
Scenario 2	40	35	43.8	42.4	3.8	7.4
Scenario 3	43	38	50.5	49.9	7.5	11.9

See "Operational Noise Levels" for details on the calculation scenarios.
Existing conditions projected from monitoring location M5 with 3 dBA added during periods of maximum sound transmission

R6: Site R6 is at lot 12 on Olnes Loop Rd. in the Olnes subdivision. The site is over 17,000-feet from the mine site and no noise level impacts are projected. Noise Levels are projected to range from 40 to 48 dBA, with increases of 2 to 9 dBA Leq. Table 4.10-18 provides a summary of the noise levels and noise level increases for each calculation scenario.

Table 4.10-18
Receiver R6 Noise Level Calculation Results

Calculation Scenario[1]	Existing[2]		Future		Change	
	Day	Night	Day	Night	Day	Night
Scenario 1	40	35	43.1	41.4	3.1	6.4
Scenario 2	40	35	42.1	39.7	2.1	4.7
Scenario 3	43	38	48.2	47.1	5.2	9.1

See "Operational Noise Levels" for details on the calculation scenarios.
Existing conditions projected from monitoring location M5 with 3 dBA added during periods of maximum sound transmission

R7: Site R7 is lot 14 on Luneberg Rd., the northern-most lot in the Olnes subdivision. The site is approximately 7,560 feet from the mine site, and is projected to have daytime noise levels of 42 to 48 dBA Leq, and nighttime levels of 39 to 47 dBA Leq. Noise levels are expected to increase by 2 to 6 dBA under normal conditions, with maximum increases of 9 dBA under scenario 3. Table 4.10-19 provides a summary of the noise levels and noise level increases for each calculation scenario.

Table 4.10-19
Receiver R7 Noise Level Calculation Results

Calculation Scenario[1]	Existing[2]		Future		Change	
	Day	Night	Day	Night	Day	Night
Scenario 1	40	35	43.1	41.3	3.1	6.3
Scenario 2	40	35	42.0	39.6	2.0	4.6
Scenario 3	43	38	48.1	47.1	5.1	9.1

See "Operational Noise Levels" for details on the calculation scenarios.
Existing conditions projected from monitoring location M5 with 3 dBA added during periods of maximum sound transmission

4.10.15 HAYSTACK RESIDENTIAL SUBDIVISION NOISE LEVELS

R8: Site R8 is in the Haystack Ridge subdivision, lot 5 on Haystack Drive, 4,300 feet south of the Cogan Drive "Y" intersection. The site is approximately 18,800 feet west of the project location. No impacts are projected at this receiver or other homes in the general vicinity due to the large distance to the project. Table 4.10-20 provides a summary of the noise levels and noise level increases for each calculation scenario.

Table 4.10-20
Receiver R8 Noise Level Calculation Results

Calculation Scenario[1]	Existing[2]		Future		Change	
	Day	Night	Day	Night	Day	Night
Scenario 1	40	35	40.4	36.2	0.4	1.2
Scenario 2	40	35	40.2	35.7	0.2	0.7
Scenario 3	43	38	44.1	40.8	1.1	2.8

See "Operational Noise Levels" for details on the calculation scenarios.
Existing conditions projected from monitoring location M6 with 3 dBA added during periods of maximum sound transmission

R9: Site R9 is in the Haystack Ridge subdivision, lot 10 on Leuthold Drive, just south of the Haystack Dr. – Leuthold Dr. intersection. The site is approximately 19,200-feet west of the project location. No impacts are projected at this receiver or other homes in the general vicinity due to the large distance from the project. Table 4.10-21 provides a summary of the noise levels and noise level increases for each calculation scenario.

Table 4.10-21
Receiver R9 Noise Level Calculation Results

Calculation Scenario[1]	Existing[2]		Future		Change	
	Day	Night	Day	Night	Day	Night
Scenario 1	40	35	40.4	36.2	0.4	1.2
Scenario 2	40	35	40.2	35.7	0.2	0.7
Scenario 3	43	38	44.1	40.7	1.1	2.7

See "Operational Noise Levels" for details on the calculation scenarios.
Existing conditions projected from monitoring location M6 with 3 dBA added during periods of maximum sound transmission

R10: Site R10 is also in the Haystack Ridge subdivision. R10 is at Lot 7 in the northern most extension of the development. The site is approximately 19,900feet west of the project location. No impacts are projected at this receiver or other homes in the general vicinity due to the large distance to the project. Table 4.10-22 provides a summary of the noise levels and noise level increases for each calculation scenario.

Table 4.10-22
Receiver R10 Noise Level Calculation Results

Calculation Scenario[1]	Existing[2]		Future		Change	
	Day	Night	Day	Night	Day	Night
Scenario 1	40	35	40.4	36.1	0.4	1.1
Scenario 2	40	35	40.2	35.6	0.2	0.6
Scenario 3	43	38	44.0	40.6	1.0	2.6

See "Operational Noise Levels" for details on the calculation scenarios.
Existing conditions projected from monitoring location M6 with 3 dBA added during periods of maximum sound transmission

4.10.16 PEDRO DOME AND CLEARY SUMMIT RESIDENTIAL SUBDIVISIONS NOISE LEVELS

R11: Site R11 is on Pedro Dome Road - at the end of the roadway at the communication tower. This site was calculated as a reference site only, and therefore

no impacts are projected. Table 4.10-23 provides a summary of the noise levels and noise level increases for each calculation scenario.

Table 4.10-23
Receiver R11 Noise Level Calculation Results

Calculation Scenario[1]	Existing[2]		Future		Change	
	Day	Night	Day	Night	Day	Night
Scenario 1	46	40	46.1	40.5	0.1	0.5
Scenario 2	46	40	46.1	40.5	0.1	0.5
Scenario 3	49	43	49.1	43.5	0.1	0.5

See "Operational Noise Levels" for details on the calculation scenarios.
Existing conditions projected from monitoring location M3 with 3 dBA added during periods of maximum sound transmission

R12: Site R12 is Lot 2 on the northwest corner of Ridge Run Rd., northwest of Pedro Dome Rd. No impacts are projected due to the 17,600 foot distance and topography between True North and this site. Table 4.10-24 provides a summary of the noise levels and noise level increases for each calculation scenario.

Table 4.10-24
Receiver R12 Noise Level Calculation Results

Calculation Scenario[1]	Existing[2]		Future		Change	
	Day	Night	Day	Night	Day	Night
Scenario 1	46	40	46.1	40.4	0.1	0.4
Scenario 2	46	40	46.0	40.1	0.0	0.1
Scenario 3	49	43	49.1	43.3	0.1	0.3

See "Operational Noise Levels" for details on the calculation scenarios.
Existing conditions projected from monitoring location M3 with 3 dBA added during periods of maximum sound transmission

R13: Site R13 is Lot 16, at the northwest corner of Rock Run Rd. west of the Steese Hwy. Again, no impacts are projected due to the 18,400foot distance and topography between True North and this site. Table 4.10-25 provides a summary of the noise levels and noise level increases for each calculation scenario.

Table 4.10-25
Receiver R13 Noise Level Calculation Results

Calculation Scenario[1]	Existing[2]		Future		Change	
	Day	Night	Day	Night	Day	Night
Scenario 1	46	40	46.1	40.3	0.1	0.3
Scenario 2	46	40	46.0	40.1	0.0	0.1
Scenario 3	49	43	49.1	43.3	0.1	0.3

See "Operational Noise Levels" for details on the calculation scenarios.
Existing conditions projected from monitoring location M3 with 3 dBA added during periods of maximum sound transmission

R14: Site 14 is on Skiland Rd., west of the Skiland Resort near the residential land use. At a distance of over 22,000 feet, True North operations are not expected to be audible. Table 4.10-26 provides a summary of the noise levels and noise level increases for each calculation scenario.

Table 4.10-26

Receiver R14 Noise Level Calculation Results

Calculation Scenario[1]	Existing[2]		Future		Change	
	Day	Night	Day	Night	Day	Night
Scenario 1	50	45	50.0	45.1	0.0	0.1
Scenario 2	50	45	50.0	45.0	0.0	0.0
Scenario 3	53	48	53.0	48.1	0.0	0.1

See "Operational Noise Levels" for details on the calculation scenarios.

Existing conditions projected from monitoring location M4 with 3 dBA added during periods of maximum sound transmission

R15: Site R15 is along the Steese Hwy., north of Cleary Summit approximately 2 miles. The distance to True North is approximately 12,100feet and this site was examined for reference. Table 4.10-27 provides a summary of the noise levels and noise level increases for each calculation scenario.

Table 4.10-27

Receiver R15 Noise Level Calculation Results

Calculation Scenario[1]	Existing[2]		Future		Change	
	Day	Night	Day	Night	Day	Night
Scenario 1	50	45	50.1	45.2	0.1	0.2
Scenario 2	50	45	50.0	45.1	0.0	0.1
Scenario 3	53	48	53.1	48.2	0.1	0.2

See "Operational Noise Levels" for details on the calculation scenarios.

Existing conditions projected from monitoring locations M3 and M4 with 3 dBA added during periods of maximum sound transmission

4.10.17 TRAFFIC ANALYSIS

The following sections contain the results of the traffic noise analysis for each of the areas in the project area.

For the purpose of discussing potential traffic noise levels and performing an impact analysis, the same three areas were used: Olnes, Haystack, and Pedro Dome/Cleary Summit.

Olnes Area Noise Traffic Noise Levels

The operational noise level calculations included noise related to idling and moving haul and ore trucks in and around the mining operation. The proposed haul routes would not have any trucks moving through or near the Olnes area. No significant traffic related noise impacts are projected for this area.

Haystack Area Traffic Noise Levels

The operational noise level calculations include noise related to idling and moving haul and ore trucks in and around the mining operations. None of the proposed haul routes would be anywhere near the Haystack development. No significant traffic related noise impacts are projected for this area.

Cleary Summit and Skiland Residential Area Traffic Noise Levels

Because of the close proximity of the proposed haul route to residents in these areas, a detailed noise analysis was performed. Normally, a traffic noise analysis is performed for the peak-traffic noise hour, which is usually between 4 pm and 6 pm for most well traveled roadways. However, traffic flow on the Steese Highway and other nearby arterial roads, such as Fairbanks Creek Road, does not have a clearly defined peak-traffic hour. The level of traffic through this area varies with time of year, workload levels at Fort Knox, and other intangibles that make it difficult to perform the analysis for a single hour during the day. Furthermore, selecting a single hour may not accurately define the impact that the proposed access haul route might have on surrounding residents. Therefore, after careful review of traffic flow information obtained from the ADOT/PF, it was determined that the analysis should be performed for two nominal

periods, one representing the average daytime traffic flow and noise levels and another representing the nighttime traffic flow and noise levels.

In addition to the two selected daily analysis periods, the analysis would also be performed under three different climatic seasons, as shown in Table 4.10-9. As a result, there are calculations for average daytime and nighttime hours under climatic conditions for each of the three defined seasons and climatic conditions. Using these methods, the access haul route noise analysis covers the wide range of varying climatic and seasonal traffic conditions found in the project area.

As previously described, input to the traffic noise prediction model includes the number of passenger vehicles, medium trucks, and heavy trucks in addition to the estimated or measured travel speeds, topographical information for the roadway and receiver locations, ground cover between roadway and receiver, temperature and humidity. Traffic data for the Steese Highway was obtained from the ADOT/PF with additional traffic data for vehicles serving Fort Knox and the proposed True North haul route to and from Fort Knox.

Noise level calculations were performed using existing and future traffic volumes for each of the climatic conditions. Table 4.10-28 shows average daily traffic volumes information used in the analysis. Fairbanks Creek Road traffic assumed the worst case that every employee drives his/her own vehicle every shift. Information on the ground cover, temperature and humidity used for each of the individual climatic conditions is shown in Table 4.10-9. Existing conditions calculated traffic noise levels compared favorably with the noise level measurements given in Table 3.15-1.

Table 4.10-28

Summary of Existing and Future Average Daily Traffic Volumes[1]

Roadway	Existing Traffic Volumes[2]			Future Traffic Volumes[3]		
	Winter	Fall/Spring	Summer	Winter	Fall/Spring	Summer
Steese Highway	1007	1219	1504	1007	1219	1504
Fairbanks Creek Rd.	534	534	534	24	30	36
Haul Route	--[4]	--[4]	--[4]	574	574	574

Traffic volumes from the Alaska Department of Transportation and FGMI

Current traffic level with all Fort Knox traffic using Fairbanks Creek Road (assumes the worst case that every employee drives his/her own vehicle every shift)

Future project traffic volumes with the majority of Fort Knox traffic using the new haul route and traffic along Fairbanks becoming primarily local access with limited Fort Knox traffic

Haul route currently not constructed, and therefore has no traffic volumes

The seven long-term noise monitoring locations described as M7 through M13 **(**Fig. 3.15-2 and Table 3.15-1), plus an additional 5 locations, were selected for receiver locations in the traffic noise model. Six of the receivers are located throughout the Cleary Summit Subdivision Residential area, and five residential and one commercial receiver are located in the Skiland Subdivision residential area. The receiver locations, numbered T1 through T12, are shown on Figure 4.10-5 with a summary of projected existing traffic noise levels given in Table 4.10-29, and future traffic noise levels with the proposed haul route in Table 4.10-30.

Figure 4.10-5 Access haul route receiver locations

Table 4.10-29

Summary of Existing Traffic Noise Levels[1]

Receiver Notation	Location Description[2]	Dist to Haul Route in ft[3]	Existing Noise Levels[4]		
			Winter	Fall/Spring	Summer
T1	Lot 2 at the west end of Ridge Run	1160	30 – 31	28 – 33	32 - 37
T2	Lot 2 at the west end of Pedro Dome Rd.	680	34 – 37	32 – 38	35 – 40
T3	Tom Walyer residence on Ridge Run located ½ way up the road on the south side	1070	33 – 35	31 – 37	34 - 40
T4	Lot 7 on Pedro Dome Rd., approx 1100 ft from the Steese	925	37 – 39	35 – 41	37 - 43
T5	Brent LeValley residence on Ridge Run, located approx 1300 ft from the Steese Hwy	1430	35 – 36	33 – 37	35 – 40
T6	Lot 9 on Ridge Run, first lot, approx 450 ft to the Steese	1310	41 – 42	39 – 43	41 - 45
T7	Lot 5, between Skiland Rd. and Fairbanks Creek Rd.	1250	35 – 36	34 – 35	35 – 36
T8	Mt Aurora Fairbanks Creek Bed & Breakfast located just east of Fairbanks Creek Rd.	1000	39 – 40	39 – 40	39 – 40
T9	Cleary Summit Bed & Breakfast located east and up the hill from receiver T8	1315	35 – 36	34 – 35	35 - 36
T10	Lance Parrish Residence located at the top of the hill, west of the Skiland Lodge	1640	32 – 33	30 – 33	33 – 34
T11	Mike Goulding Residence located east of Fairbanks Creek Rd. along the south side of the hill	1600	32 – 33	30 – 33	33 – 34
T12	Skiland Resort, near the chair lift – commercial land use	2200	26 – 28	23 – 27	29 - 30

Detailed traffic noise levels for each receiver location are given in Tables 6-31 to 6-42.

Location and lot information obtained from CAD drawings provided by the City of Fairbanks. T1 – T6 are located in Cleary Summit Subdivision and T7 – T12 are located in the Skiland Subdivision

Distances were measured on CAD drawings provided by FGMI.

Range of projected traffic noise levels by season at representative receiver locations with proposed haul route. Values are rounded accordingly with detailed results presented in tables that follow.

Table 4.10-30

Summary of Future Traffic Noise Levels with proposed Haul Route1

Receiver Notation	Location Description2	Dist to Haul Route in feet3	Projected Future Noise Levels4		
			Winter	Fall/Spring	Summer
T1	Lot 2 at the west end of Ridge Run	1160	38 – 40	37 – 38	37 – 38
T2	Lot 2 at the west end of Pedro Dome Rd.	680	43 – 44	41 – 43	43 – 44
T3	Tom Walyer residence on Ridge Run located ½ way up the road on the south side	1070	42 – 43	40 – 42	42 – 43
T4	Lot 7 on Pedro Dome Rd., approx 1100 ft from the Steese	925	40	39 –41	41 – 43
T5	Brent LeValley residence on Ridge Run, located approx 1300 ft from the Steese Hwy	1430	38 – 39	36 – 39	39 – 40
T6	Lot 9 on Ridge Run, first lot, approx 450 ft to the Steese	1310	40 – 41	39 – 41	41 – 43
T7	Lot 5, between Skiland Rd. and Fairbanks Creek Rd.	1250	38 – 40	37 – 38	38 – 39
T8	Mt Aurora Fairbanks Creek Bed & Breakfast located just east of Fairbanks Creek Rd.	1000	41 – 42	39 – 41	40 –41
T9	Cleary Summit Bed & Breakfast located east and up the hill from receiver T8	1315	39 – 41	38 – 40	39 – 40
T10	Lance Parrish Residence located at the top of the hill, west of the Skiland Lodge	1640	38 – 41	38 – 39	39
T11	Mike Goulding Residence located east of Fairbanks Creek Rd. along the south side of the hill	1600	38 – 40	37 – 38	38
T12	Skiland Resort, near the chair lift – commercial land use	2200	32 – 35	31 – 33	34

Detailed traffic noise levels for each receiver location are given in Tables 6-31 to 6-42.

Location and lot information obtained from CAD drawings provided by the City of Fairbanks. T1 – T6 are located in Cleary Summit Subdivision and T7 – T12 are located in the Skiland Subdivision

Distances were measured on CAD drawings provided by FGMI.

Range of projected traffic noise levels by season at representative receiver locations with proposed haul route. Values are rounded accordingly with detailed results presented in tables that follow.

The following text and tables contain detailed information on the noise level calculations performed at each receiver location T1 through T12. For each receiver location noise levels were projected for nominal daytime and nighttime traffic volumes. Additionally, the noise level projections were made for each of the three climatic conditions as described in Table 4.10-9.

T 1: Receiver T1 is the western-most lot in the Cleary Summit Residential Subdivision. Traffic related noise levels are projected to increase between 6.6 and 9.5 dBA during winter months, with the highest increases occurring when temperatures fall below –20 degrees. Fall and spring noise levels have projected increases of 4.7 to 8.5 dBA, and summer noise level increases are projected to be between 1.7 and 6.9 dBA Leq. Table 4.10-31 provides the details on the traffic noise level projections. Even though increases during the colder winter months are projected to reach 9.5 dBA Leq, this noise level increase would only occur when temperatures reach extremes, does not exceed the 10 dBA criteria and therefore is not considered a significant noise impact.

Table 4.10-31
Traffic Noise Levels at Receiver T 1[1]

Season[2]	Time of Day[3]	Projected Future Noise Levels[4]		
		Existing	Future	Change
Winter	Daytime	31.2	37.8	6.6
	Nighttime	30.5	40.0	9.5
Fall/Spring	Daytime	33.3	38.0	4.7
	Nighttime	28.1	36.6	8.5
Summer	Daytime	37.0	38.7	1.7
	Nighttime	31.7	38.6	6.9

NOTE: Noise levels listed in **BOLD** exceed the established criteria
Projected traffic noise levels form TNM
See table 6-9 for details on the season splits and input data associated with each season
Daytime is 7 am to 10 pm and nighttime is 10 pm to 7 am
Projected traffic noise levels for existing and future traffic volumes and the increase in noise levels with the project

T2: Receiver T2 is also located in the Cleary Summit Subdivision. The lot is located along Pedro Dome Road, and is the last identified lot on the southwestern end of the

subdivision. Potential traffic noise level increases during the nighttime winter and fall/spring seasons are projected at 9.7 to 9.9 dBA L_{eq}. The noise from the ore trucks crossing the Steese Highway was determined as the primary noise source at this location. Increases during other times of the year are projected to be between 2.9 and 8.2 dBA, with the highest increase occurring during nighttime hours. As with receiver T1, the highest traffic noise level increase would only occur when temperatures reach extremes and no exceedance of the criteria was identified. Table 4.10-32 provides the details on the traffic noise level projections.

Table 4.10-32
Traffic Noise Levels at Receiver T 2[1]

Season[2]	Time of Day[3]	Projected Future Noise Levels[4]		
		Existing	Future	Change
Winter	Daytime	36.9	42.9	6.0
	Nighttime	33.9	43.8	9.9
Fall/Spring	Daytime	38.0	42.9	4.9
	Nighttime	31.8	41.5	9.7
Summer	Daytime	40.8	43.7	2.9
	Nighttime	34.7	42.9	8.2

NOTE: Noise levels listed in **BOLD** exceed the established criteria
Projected traffic noise levels form TNM
See table 6-9 for details on the season splits and input data associated with each season
Daytime is 7 am to 10 pm and nighttime is 10 pm to 7 am
Projected traffic noise levels for existing and future traffic volumes and the increase in noise levels with the project

T3: Receiver T3 is the Tom Walyer residence located in the Cleary Summit subdivision along Ridge Run. Future traffic noise levels of 31.2 to 43.9 dBA L_{eq} are projected to result in noise level increases of 3.2 to 9.0 dBA under the build alternative. As with T1 and T2, the highest traffic noise level increases occur during the colder winter nighttime hours. No significant traffic noise impacts were identified at this receiver location. Table 4.10-33 provides the details on the traffic noise level projections.

Table 4.10-33

Traffic Noise Levels at Receiver T 3[1]

Season[2]	Time of Day[3]	Projected Future Noise Levels[4]		
		Existing	Future	Change
Winter	Daytime	35.4	42.1	6.7
	Nighttime	33.4	42.4	9.0
Fall/Spring	Daytime	36.7	42.2	5.5
	Nighttime	31.2	40.1	8.9
Summer	Daytime	39.7	42.9	3.2
	Nighttime	34.2	41.7	7.5

NOTE: Noise levels listed in **BOLD** exceed the established criteria

Projected traffic noise levels form TNM

See table 6-9 for details on the season splits and input data associated with each season

Daytime is 7 am to 10 pm and nighttime is 10 pm to 7 am

Projected traffic noise levels for existing and future traffic volumes and the increase in noise levels with the project

T4: Receiver T4 is located near the center of the Cleary Summit Subdivision, just up the hill from the Steese Highway along Pedro Dome Road. Maximum traffic noise level increases of 4.6 dBA are projected during the coldest winter months. During the summertime, when traffic volumes on the Steese Highway are at their highest, there is the potential for a slight (-0.1) decrease in noise levels as a significant number of vehicles are projected to use the new haul road to access Fort Knox mine rather than continuing up the Steese highway to Fairbanks Creek Road. No significant traffic noise impacts related to the haul route are projected at this location. Table 4.10-34 provides the details on the traffic noise level projections.

Table 4.10-34

Traffic Noise Levels at Receiver T 4[1]

Season[2]	Time of Day[3]	Projected Future Noise Levels[4]		
		Existing	Future	Change
Winter	Daytime	39.6	41.0	1.4
	Nighttime	36.6	41.2	4.6
Fall/Spring	Daytime	40.6	41.3	0.7
	Nighttime	34.8	38.9	4.1
Summer	Daytime	42.9	42.8	-0.1
	Nighttime	37.1	40.8	3.7

NOTE: Noise levels listed in **BOLD** exceed the established criteria

Projected traffic noise levels form TNM

See table 6-9 for details on the season splits and input data associated with each season

Daytime is 7 am to 10 pm and nighttime is 10 pm to 7 am

Projected traffic noise levels for existing and future traffic volumes and the increase in noise levels with the project.

T5: Receiver T5 is the Brent LeValley residence, located approximately 1000 feet up Ridge Run from the Steese Highway in the Cleary Summit Residential Subdivision. Maximum traffic noise levels are projected during the winter months when the noise from the ore trucks has the least atmospheric reduction. Traffic noise levels are projected to range from 36.2 to 40.0 dBA with increases over existing conditions of 0.1 to 4.1 dBA L_{eq}. No significant traffic noise impacts were identified at this location. Table 4.10-35 provides the details on the traffic noise level projections.

Table 4.10-35
Traffic Noise Levels at Receiver T 5[1]

Season[2]	Time of Day[3]	Projected Future Noise Levels[4]		
		Existing	Future	Change
Winter	Daytime	35.7	38.3	2.6
	Nighttime	34.9	39.0	4.1
Fall/Spring	Daytime	36.8	38.7	1.9
	Nighttime	32.5	36.2	3.7
Summer	Daytime	39.9	40.0	0.1
	Nighttime	35.3	38.6	3.3

NOTE: Noise levels listed in **BOLD** exceed the established criteria

1. Projected traffic noise levels form TNM
2. See table 6-9 for details on the season splits and input data associated with each season
3. Daytime is 7 am to 10 pm and nighttime is 10 pm to 7 am
4. Projected traffic noise levels for existing and future traffic volumes and the increase in noise levels with the project.

T6: Receiver T6 is the eastern most residential lot in the Cleary Summit Subdivision. Traffic noise levels at this location are projected to remain within 2 dBA of the current levels, with the potential for traffic noise reductions due to a reduction of traffic

accessing Fort Knox from Fairbanks Creek Road. No significant traffic noise impacts were identified at this location. Table 4.10-36 provides the details on the traffic noise level projections.

Table 4.10-36

Traffic Noise Levels at Receiver T 6[1]

Season[2]	Time of Day[3]	Projected Future Noise Levels[4]		
		Existing	Future	Change
Winter	Daytime	42.0	40.3	-1.7
	Nighttime	40.5	40.6	0.1
Fall/Spring	Daytime	42.7	40.9	-1.8
	Nighttime	39.1	38.9	-0.2
Summer	Daytime	44.9	42.7	-2.2
	Nighttime	40.5	40.6	0.1

NOTE: Noise levels listed in **BOLD** exceed the established criteria

1. Projected traffic noise levels form TNM
2. See table 6-9 for details on the season splits and input data associated with each season
3. Daytime is 7 am to 10 pm and nighttime is 10 pm to 7 am
4. Projected traffic noise levels for existing and future traffic volumes and the increase in noise levels with the project

T7: Receiver T7 is one of the northern lots located in the Skiland Residential Subdivision. The lot is located to the east and up the hill from the Fairbanks Creek Road. Future traffic noise levels of 36.5 to 40.0 dBA are projected to result in noise level increases of 2.1 to 4.2 dBA Leq. No significant traffic noise impacts are projected and Table 4.10-37 provides the details on the traffic noise level projections.

Table 4.10-37

Traffic Noise Levels at Receiver T 7[1]

Season[2]	**Time of Day[3]**	**Projected Future Noise Levels[4]**		
		Existing	**Future**	**Change**
Winter	Daytime	35.1	37.9	2.8
	Nighttime	35.8	40.0	4.2
Fall/Spring	Daytime	35.2	38.2	3.0
	Nighttime	33.7	36.5	2.8
Summer	Daytime	36.3	38.4	2.1
	Nighttime	35.6	38.5	2.9

NOTE: Noise levels listed in **BOLD** exceed the established criteria

1. Projected traffic noise levels form TNM
2. See table 6-9 for details on the season splits and input data associated with each season
3. Daytime is 7 am to 10 pm and nighttime is 10 pm to 7 am
4. Projected traffic noise levels for existing and future traffic volumes and the increase in noise levels with the project

T8: Receiver T8 is the Mt. Aurora Fairbanks Creek Bed & Breakfast, located up the hill from the Fairbanks Creek Road. Minimal traffic noise level increases are projected at this location due to the lower elevation and higher existing noise from traffic noise along Fairbanks Creek Road. Future traffic noise levels of 39.2 to 42.2 dBA are projected to result in increases of only 0.2 to 2.0 dBA Leq. No significant traffic noise impacts are projected and Table 4.10-38 provides the details on the traffic noise level projections.

Table 4.10-38

Traffic Noise Levels at Receiver T 8[1]

Season[2]	Time of Day[3]	Projected Future Noise Levels[4]		
		Existing	Future	Change
Winter	Daytime	39.7	40.8	1.1
	Nighttime	40.2	42.2	2.0
Fall/Spring	Daytime	39.7	40.8	1.1
	Nighttime	39.0	39.2	0.2
Summer	Daytime	40.0	40.6	0.6
	Nighttime	39.8	40.8	1.0

NOTE: Noise levels listed in **BOLD** exceed the established criteria

1. Projected traffic noise levels form TNM
2. See table 6-9 for details on the season splits and input data associated with each season
3. Daytime is 7 am to 10 pm and nighttime is 10 pm to 7 am
4. Projected traffic noise levels for existing and future traffic volumes and the increase in noise levels with the project

T9: Receiver T9 is the Cleary Summit Bed and Breakfast. The mixed use resident is located behind, and up the hill from receiver T8. Traffic noise level increases of 3.4 to 5.6 are projected due to a reduction in shielding from the proposed haul route and reduced existing noise levels. Future traffic noise levels at this location are projected to be between 38.2 to 41.4 dBA Leq. No significant traffic noise impacts are projected and Table 4.10-39 provides the details on the traffic noise level projections.

Table 4.10-39

Traffic Noise Levels at Receiver T 9[1]

Season[2]	Time of Day[3]	Projected Future Noise Levels[4]		
		Existing	Future	Change
Winter	Daytime	34.9	39.3	4.4
	Nighttime	35.8	41.4	5.6
Fall/Spring	Daytime	35.3	39.6	4.3
	Nighttime	33.6	38.2	4.6
Summer	Daytime	36.1	39.5	3.4
	Nighttime	35.4	39.8	4.4

NOTE: Noise levels listed in **BOLD** exceed the established criteria

1. Projected traffic noise levels form TNM
2. See table 6-9 for details on the season splits and input data associated with each season
3. Daytime is 7 am to 10 pm and nighttime is 10 pm to 7 am
4. Projected traffic noise levels for existing and future traffic volumes and the increase in noise levels with the project

T10: Receiver T10 is the Lance Parrish resident located on top of the hill in the Skiland Residential Subdivision. Because the residence is located on the northern end of the hill and has clear line of sight to the Steese Highway, noise from the proposed haul route is projected to result in noise level increases of 5.6 to 8.0 dBA. Future traffic noise levels are projected to be between 37.7 to 40.8 dBA L_{eq}. No significant traffic noise impacts are projected and Table **4.10-40** provides the details on the traffic noise level projections.

4.10-40

Traffic Noise Levels at Receiver T 10[1]

Season[2]	**Time of Day[3]**	**Projected Future Noise Levels[4]**		
		Existing	**Future**	**Change**
Winter	Daytime	31.9	38.4	6.5
	Nighttime	32.8	40.8	8.0
Fall/Spring	Daytime	33.4	39.0	5.6
	Nighttime	30.0	37.7	7.7
Summer	Daytime	34.3	38.9	4.6
	Nighttime	32.5	39.2	6.7

NOTE: Noise levels listed in **BOLD** exceed the established criteria

1. Projected traffic noise levels form TNM
2. See table 6-9 for details on the season splits and input data associated with each season
3. Daytime is 7 am to 10 pm and nighttime is 10 pm to 7 am
4. Projected traffic noise levels for existing and future traffic volumes and the increase in noise levels with the project

T11: Receiver T11 is the Mike Goulding residence, also located on the top of the hill in the Skiland Residential Subdivision. The residence is located along the southern end of the hill and has a clear view of portions of the proposed haul route. Future traffic noise levels at this location are projected to range between 30.3 to 40.1 dBA with noise level increases of 4.1 to 7.2 dBA. No significant traffic noise impacts are projected and Table 4.10-41 provides the details on the traffic noise level projections.

Table 4.10-41

Traffic Noise Levels at Receiver T 11[1]

Season[2]	Time of Day[3]	Projected Future Noise Levels[4]		
		Existing	Future	Change
Winter	Daytime	31.9	37.8	5.9
	Nighttime	32.9	40.1	7.2
Fall/Spring	Daytime	32.8	38.2	5.4
	Nighttime	30.3	36.7	6.4
Summer	Daytime	33.9	38.0	4.1
	Nighttime	32.7	38.3	5.6

NOTE: Noise levels listed in **BOLD** exceed the established criteria

1. Projected traffic noise levels form TNM
2. See table 6-9 for details on the season splits and input data associated with each season
3. Daytime is 7 am to 10 pm and nighttime is 10 pm to 7 am
4. Projected traffic noise levels for existing and future traffic volumes and the increase in noise levels with the project

T12: Receiver T12 is the Skiland Ski Lodge. The lodge is considered a commercial land use. Noise levels are projected to increase by 3.7 to 7.7 dBA L_{eq} with future noise levels of 30.9 to 35.2 dBA. Actual noise level increases at this location would be considerably less during those times when the ski resort is in operation due to added noise levels from the operation of the chair lift and increased local traffic. No significant traffic noise impacts are projected and Table 4.10-42 provides the details on the traffic noise level projections.

Table 4.10-42
Traffic Noise Levels at Receiver T 12[1]

Season[2]	Time of Day[3]	Projected Future Noise Levels[4]		
		Existing	Future	Change
Winter	Daytime	26.4	32.1	5.7
	Nighttime	27.6	35.2	7.6
Fall/Spring	Daytime	26.9	33.0	6.1
	Nighttime	23.2	30.9	7.7
Summer	Daytime	29.9	33.6	3.7
	Nighttime	27.9	33.6	5.7

NOTE: Noise levels listed in **BOLD** exceed the established criteria

1. Projected traffic noise levels form TNM
2. See table 6-9 for details on the season splits and input data associated with each season
3. Daytime is 7 am to 10 pm and nighttime is 10 pm to 7 am
4. Projected traffic noise levels for existing and future traffic volumes and the increase in noise levels with the project

4.10.18 CUMULATIVE NOISE ANALYSIS

In addition to calculating noise levels separately from mine operations and from ore hauling, additional consideration was given to the future cumulative noise levels of both

activities, where applicable. The following described the results of the cumulative noise analysis. There would be no significant cumulative noise impacts

Olnes Residential Subdivisions Traffic Noise Levels

The operational noise level calculations include noise related to idling and moving haul and ore trucks in and around the mine operations, and therefore the cumulative noise levels and noise impacts for the Olnes area would be the same as those in Tables 4.10-11 through 4.10-17.

Haystack Residential Subdivision Traffic Noise Levels

The operational noise level calculations include noise related to idling and moving haul and ore trucks in and around the mine operations, and therefore the cumulative noise levels and noise impacts for the Haystack area would be the same as those in Tables 4.10-18 through 4.10-20.

Cleary Summit and Skiland Residential Subdivisions Traffic Noise Levels

Because of the distance and shielding between the mining location and the sensitive receivers near the Cleary Summit and Skiland residential subdivisions, cumulative noise levels related to the project would be mainly by trucks using the access haul route to Fort Knox. No traffic Significant noise impacts were identified. No significant cumulative noise impacts are projected in these subdivisions from development of True North.

4.10.19 SUMMARY DISCUSSION

In discussing noise and noise impacts it is easy to become immersed in the technical aspects of sound and to lose sight of what the dry figures actually represent. To understand what the tables mean in the real world it is important to put these numbers into perspectives that can be understood by the layman. With respect to existing baseline noise levels at the 12 receiver locations at the Cleary Summit and Skiland subdivisions (Table 4.10-29), and the predicted noise levels at the same locations (Table 4.10-30), a summary discussion is in order.

As shown in Table 4.10-29, existing noise levels on Cleary Summit are quiet. For all seasons, most measurements in dBA range from the low to high 30s with one receptor

near the Steese Highway in the low to mid-40s. As shown in Table 4.10-2 that lists typical noise sources, the large majority of these existing sound levels equate to something between somewhat louder than a “quiet library” or “soft whisper” to something approaching a “quiet living room” or “bird calls” at the exterior wall of the residences.

The predicted future noise levels at these same 12 receptor sites, shown in Table 4.10-30, indicate generally that increases in noise due to operation of the access haul road would raise to levels between the high 30s and low 40s. As shown in Table 4.10-2, those sound levels equate to something between somewhat quieter then a “quiet living room” or “bird calls” to something louder than a “quiet living room” or “bird calls” at the exterior wall of the residences. Certainly, the predicted noise levels don’t begin to approach 50 dBA which the table lists as equivalent to “light auto traffic” at a distance of 100 ft that has a subjective impression of “quiet.”

The Federal Housing Administration (FHA) and HUD have established a criterion of 45 dBA as the maximum allowable level for the inside of bedrooms in new home construction. Thus, the increased noise levels from access haul road traffic at the exterior of Cleary Summit residences generally would be less than the FHA and HUD standard for the interiors of bedrooms in those residences. And, because the average residence has noise reductions of 22 to 35 dBA, there definitely would be no significant noise impacts to the interior of these residences.

With respect to individuals on the outside deck of a residence, the average noise level of two people having a conversation at a distance of 3 feet is between 60 and 65 dBA. Normally, if one noise level is more than 10 dBA below another, the quieter noise level is not noticeable. Therefore, if several people were on a deck during nighttime hours, having a normal conversation, their voices would be significantly louder than the trucks on the access haul road.

All this does not mean that on occasion the ore trucks would not be clearly audible. It does mean, however, that even with the existing low background noise levels in the Cleary Summit area the projected noise levels due to ore truck traffic are not significant when *interior* noise levels are well below the FHA and HUD bedroom standards, and the

exterior noise levels are not high enough to cause disruption in a normal conversation at 3 feet.

4.10.20 NOISE MITIGATION MEASURES

As discussed above in Section 4.10.5, minimal noise impacts were predicted for the nearest receiver to the True North Mine site under noise projection scenario 3. Due to the conservative methods used in the calculations, it is unlikely that noise levels over 50 dBA L_{eq} would be experienced from mine operations at this location. As part of its proposed project, FGMI would implement mitigation that would help to insure that noise levels remain as low as possible, thus reducing the chance for an impact at the receiver closest to the mine site, R5. Noise mitigation measures may be found in Section 2.3.21 (Mitigation).

Also, no significant noise impacts are predicted at residences in the Cleary summit area from operation of the access haul road. To minimize such effects, however, the specific ore hauling mitigation measures found in Section 2.3.21 (Mitigation) will be implemented.

4.11 SOCIOECONOMICS

Because the True North project area is defined as the area of potential direct impacts, limiting a discussion of socioeconomic impacts strictly to the project area would not present a fair picture of the true impacts as it does for most other resources. Although workers technically do earn their incomes within the project area, because of secondary impacts and multiplier effects that accrue outside the project area, any meaningful disucssion of socioeconomic effects must include effects on the greater Fairbanks area. Therefore, in this section socioeconomic effects are discussed within the contexts of the project area, and then separately for the greater Fairbanks area.

4.11.1 TRUE NORTH PROJECT AREA

In this section, socioeconomic impacts within the True North project area are discussed in the context of changes to assessed values, and effects on businesses and the MHLT. In this context, considering the past history of increased assessment values, the minimal effects expected on businesses such as aurora viewing because of the many mitigation measures that would be taken, and the economic benefit to the MHLT, there would be no significant negative socioeconomic impacts within the True North project area. Indeed, effects on the MHLT would be positive.

Assessed Valuations -- As discussed in Section 3.16.6 (Economic Activity in the True North Study Area), overall assessed land values in the Cleary Summit and Skiland subdivisions have increased steadily during the past ten years. For both subdivisions, the major increase is assessed values occurred during the five-year period from 1994 to 1999. These were an annual average of 4.96 percent for the Cleary Summit Subdivision, and 4.65 percent for the Skiland Subdivision. This period coincided with the construction and operation of the Fort Knox Mine. While assessed values depend on several factors, a reasonable interpretation would be that the Fort Knox project has not significantly affected land values in these two subdivisions. A reasonable presumption also could be made that operation of the True North project also would not significantly affect future assessed values, especially considering that it would remove approximately 348 vehicle trips from Fairbanks Creek Road immediately in front of the Skiland Subdivision (Hage & Associates, 2000).

Aurora Viewing -- Some residents in the Cleary Summit area have expressed concerns that hauling ore from the True North Mine to the Fort Knox Mill could cause them economic hardship. This has been raised by three establishments providing aurora viewing experiences and in two cases associated lodging, primarily to tourists in winter. These facilities also are rented occasionally in other seasons for other purposes. The owners believe that noise and lights from ore trucks would degrade the experience of their customers, causing them to lose business. Some commercial interests in the Fairbanks area catering to these tourists, e.g., hotels and transportation companies, also believe they would be affected.

The access haul route has been located to use direction and slope to minimize the time truck lights would shine towards these aurora viewing establishments. Most of the time the lights would shine directly into the hillside below, and not into, the residences. Truck lights could have a shield or hood or use other mitigation methods to further reduce light escapement by focusing lights within the road right-of-way. From a noise perspective, the route has been located to reduce grades that would require heavy pulling and braking, thus lessening engine noise. Truck exhausts would be equipped with up-to-date muffler technology. Noise levels at residences on Cleary Summit would not exceed the FHWA noise abatement criterion for residential areas (See Section 4.10). Road dust would be controlled by use of water or chemicals, or by covering the road surface with snow during winter. Chip sealing the road surface would be another option.

The establishments could take mitigation measures of their own. Bus engines could be shut off rather than left idling in cold weather, or buses could be moved to a remote location if idling were necessary. While auroras can occur in any sector of the sky, they tend to appear more frequently in the northwest, north, and northeast, generally on the other side of these facilities from the right-of-way. Moving guests to the north side of the two bed-and-breakfasts and/or to the ski lodge on the north side of the summit would lessen potential disturbance from truck lights and noise. It has also been suggested that these tourism businesses might play subtle, appropriate background music and/or nature sounds to mitigate any unnatural noises that may be heard in the distance.

By their nature auroras are visible only in darkness and therefore the commercial visitor season generally is limited to the six-month period from October through March (Fairbanks Convention & Visitors Bureau, 2000). Also, auroras are not visible during periods of overcast, or during the daylight hours in winter. For a substantial majority of time, therefore, use of the haul road would not have any impacts on aurora viewing.

Some hotels in Fairbanks, and two lodges further north on the Steese Highway, list aurora-viewing as one of the attractions they can provide for their lodgers – nature permitting. Though they themselves may not provide an aurora viewing experience, their guests are bused to locations such as those at Cleary Summit and then returned to the hotels. While the Cleary Summit businesses may be a destination for many of these tourists, there are several other locations which cater to aurora viewers in the Fairbanks area. The Fairbanks Convention & Visitors Bureau Visitors Guide lists 18 such locations. The aurora, of course, can be viewed from any location beyond the influence of the bright city lights. Thus, significant effects on the Cleary Summit aurora viewing establishments are not expected. Further, any effects experienced would be localized and certainly would not significantly affect aurora viewing in the greater Fairbanks area in general.

Mental Health Land Trust -- A direct, short term beneficiary of True North development would be the State's MHLT. The trust would receive approximately $25,000 from sale of an approximately five-mile long right-of-way across trust lands for the access haul route. It likely also would receive up to $100,000 from sale of approximately 100,000 yds^3 of rock for road construction.

In addition to short term economic benefits tied directly to development of True North, the MHLT also could receive a significant cumulative benefit. The trust owns the land under the Fort Knox Mill and presently receives an approximately $150,000 annual rental for use of its lands by the mill, with that amount adjusted annually for inflation. Processing of ore from the True North Mine would extend the life of the Fort Knox Mill. Under the scenario described in Section 4.20.3, development of the True North project would extend the life of the Fort Knox Mill for approximately one-half year, benefiting the MHLT by an additional $75,000 in constant 2000 dollars.

4.11.2 GREATER FAIRBANKS AREA

In this section, socioeconomic impacts to the greater Fairbanks area are discussed within the context of changes to existing levels of population, employment, income, housing, services, and local government taxes and budgets. In this context, no significant negative socioeconomic impacts would result from project development. The project would, indeed, provide significant positive, tangible economic benefits to the community.

The community impacts of the True North project would arise mainly from the direct and indirect employment stimulated by the project, incremental population growth, and the balance of service burdens and fiscal resources the project confers on local governments.

The True North Mine is scheduled to begin operation during the fourth quarter of 2000, with a projected operating life of 3 years. The mine would operate year-round and around the clock. FGMI estimates capital development costs at between $20 to $30 million. At full operation, the permanent work force for the mine would total 100 to 110 workers (FGMI, 2000a). The mine's estimated annual operating expenditures for labor, power and support services are $14 million.

On the basis of prevailing wages in Alaska's metal-mining industry (according to ADOL, the average monthly wage of an employee was $4,264 in 1999), the mine's direct annual payroll would be approximately $5,400,00 in current dollars.

Support-sector expansion would generate additional jobs. The mine's direct employment is estimated to eventually sustain another 120 to 132 jobs in the support sector, assuming an employment multiplier of 1.2. The composition of FNSB's employment, particularly the maturity of its trade and service sectors, suggests that the region's employment multiplier is about 1.2; that is, each new basic job generates 1.2 additional jobs in the support sector. The Fairbanks housing market is stable, experiencing a fair balance of supply and demand. Both the housing market and retail trade establishments, recently somewhat reduced, may experience growth generated by Truth North’s operation. Indeed, project payrolls may serve in part to retard further

attrition of existing jobs and create some new jobs. In any case, indirect job growth triggered by the project would likely ensue gradually over several years.

In addition to direct and indirect employment payrolls, the mine also would benefit the local private sector through purchases of supplies and services from local vendors.

Economic trends indicate employment growth for Fairbanks in the next few years – a 2.2% growth in 2000 and 1.8% in 2001, with particular strength in the construction industry, an optimistic business climate, and growth or stability in most other areas of the economy (DOL, May 2000). True North will add to this generally positive scene with new basic and support-sector jobs, tapping occupational skills typically available in the resident labor pool. The new basic jobs at the mine would pay above average wages, helping reverse the long-downward trend in average wages. Year-round mining employment would further diversify and stabilize the region's cyclic and seasonal employment fluctuations.

According to the 1990 census (still reliable in 2000 according to the DOL), the ratio of population to employment in FNSB was about 2.2; that is, on the average, each job supported 2.2 persons. Applying this ratio to the project's direct employment, the project could produce an incremental population growth of approximately 230 persons. Similarly, related support-sector job growth is estimated to sustain approximately 264 - 290 residents. Thus, the total population the project might sustain would be approximately 484 - 532 persons.

The estimates of incremental employment and population growth attributable to the True North project represent a net increase of approximately 1.5 percent over current population and employment in FNSB. Given the project's location near the City of Fairbanks, it is plausible that new population growth would be about evenly split between the city and the rural part of the borough.

Several circumstances—the positive growth being experienced, as well as anticipated in the local economy, Fairbanks' stable housing market, and a slowing of recent fluctuations in retail trade —suggest that the project would be unlikely to generate short-run inflationary pressures on the local cost of living. Indeed, the added local purchasing

power stemming from project payrolls would further enhance the viability of the local housing market and businesses.

The project also appears likely to have net positive benefits on FNSB's financial situation. FNSB levies a real property tax but exempts personal property. The 1999 FNSB areawide real property tax rate was 16.184 mills (plus additional mill levies for city and local service area functions). The project's assessed valuation cannot be determined accurately at this time. If five percent of the estimated total capital development cost of approximately $25 million were taxable real property improvements, the mine initially would yield approximately $20,000 in new property tax revenue for the FNSB at the 1999 mill rate. Thereafter, the mine's assessed valuation would decline as the condition and value of mine improvements depreciated. This revenue estimate is exclusive of service area mill levies, nor does it take account of enhanced residential and commercial property values throughout the FNSB.

The per capita valuation for the mine project does not count the assessed value of residential, commercial, and other taxable property occupied or supported by the induced population. In sum, the mine project, with collateral residential and other real property improvements, clearly would enhance FNSB's real property tax base.

Because the mine site is outside the City of Fairbanks, the mine facility itself would not directly affect the city's assessed valuation. Part of the project's work force, however, would live in the city, and the central city's retail and service firms do serve the entire region. Thus, the project's payroll would enhance residential and commercial property values in the central city, thereby marginally benefiting the City of Fairbanks' fiscal situation.

Presumably, the public service burdens that the project would impose on local governments and other community-service providers would be proportionate to the induced population. The Alaska Department of Labor projects that FNSB's population will increase by about 7800 people in the decade between 1998 and 2008. The mine project's total induced population growth is estimated at approximately 230 persons. Thus, the project's induced population growth would be a modest share, perhaps .03 percent, of the decade's population growth and perhaps .003 percent of FNSB's total

population. In this regard, the project's scale of impact during construction and operation would be below the range associated with recent local construction programs.

The current local housing market and utilities systems have capacity to absorb some additional demand, with opportunity to expand capacity as needed. On the other hand, certain services are near capacity (local education in some areas of the district) or have experienced continuing cutbacks (health and social services and public safety). For these services, even modest, gradual growth might further strain their quality or facilities, unless additional program funds were provided or other facility capacity could be made available. On the basis of fiscal analysis, FNSB's new revenue potential should offset its additional service burdens.

If publicity about the project attracted a surplus of job seekers, manpower and social service agencies might temporarily face additional demand for their services. But, on the basis of local experience with recent construction projects, and should the nation’s generally upbeat economy continue to thrive, there is little reason to assume that the mine project would prompt a large influx of job seekers, especially if the nation’s generally upbeat economy continues to thrive.

The mine's expected initial operating life is 3 years. When the mine closes, its jobs and payroll would end. At that time, the local economy and the displaced workforce might experience a period of economic adjustment until alternative economic opportunities materialize.

4.12 LAND USE

In this section, the significance of impacts to land use is determined within the context of adherence to the State’s land classification criteria, and the FNSB’s Comprehensive Land Use Plan. Within these contexts, there would be no significant impact to land use from project development.

In the State’s Tanana Basin Area Plan, the True North project area is in management Unit 1-J. Most of the project area falls under subclassification 1J2, which designates the following primary land uses: minerals and public recreation. Land disposals and remote

cabins are prohibited within 1J2. The minor Cleary Summit-Pedro area falls under subclassification 1J1, which designates the primary land use as settlement; secondary surface uses are public recreation and wildlife habitat. Remote cabins are prohibited.

The True North project falls under two designations in the FNSB Comprehensive Plan, a combination of “High Mineral Potential,” and “Reserve Area.” The latter designation means uses such as mining, agriculture, recreation, hunting, trapping and fishing are all permitted until such time as a more specific highest and best use is identified.

During operations state authorized surface land uses allow only limited access to the general public. Access would be restricted because of the inherent dangers associated with the operation of large mine equipment and process components. Compliance with MSHA regulations would limit access to personnel trained to recognize hazards and observe safety rules to insure the health and safety of employees and visitors. To insure safety of mine employees and the public, all hunting, fishing and trapping within the mine lease area would be prohibited.

The True North project would alter the landscape of the mine site for the long-term. FGMI would reclaim the area to a productive post-mining land use as wildlife habitat in conjunction with the Alaska Department of Natural Resources (ADNR) and ADFG.

Construction of the new access haul road, and upgrading of portions of others, could open new areas for residential, commercial, or industrial development. This could include land sales by the State or the MHLT. These entities, however, have no present development or disposal plans in this area. State land disposals would have to conform with the State’s land classification criteria, and any developments would have to conform with FNSB zoning requirements.

4.13 CULTURAL RESOURCES

In this section, cultural impacts are discussed in the context of adherence to the cultural-resource protection procedures under 36 CFR Part 800, Subpart B (the Section 106 process), because this is the accepted process by which to mitigate impacts to cultural

resources. In this context, no significant impacts to cultural resources are expected from project development.

Archaeology is a study that involves the removal from the ground or final resting place of information to a processing and analysis laboratory. A site may be physically removed, but the information, including measurements, photographs, and matrix samples, is salvaged through careful removal techniques and scientific inquiries. Important artifacts can be removed for preservation in perpetuity. Reconstruction of the site occurs in the completion of reports about the excavation and inquiries. Thus, while sites and artifacts may be taken from their surface and subsurface placement, information such as who lived at the site, their activities, and the importance of the site lives on through careful documentation and recording.

Losses of cultural resources normally occur from primary effects, such as destruction from project activity where no information has been gathered. Secondary effects may include increased pedestrian travel over cultural resource sites and uses of newly created access that result in unauthorized visitation or, at worst, site looting.

All five sites identified in the mine area that were expected to require additional levels of documentation to assess their eligibility for inclusion on the National Resister of Historic Places were located outside of the area that would be disturbed by the proposed Hindenburg and East pits and the ancillary facilities of the True North project. The historic Davidson Ditch, which runs through the claims block, is already on the National Resister of Historic Places. True North development would not affect the Davidson Ditch. The State Historic Preservation Office (SHPO), however, has recommended that the sites still receive proper recordation, and that any potential future crossings of the Davidson Ditch desired by FGMI be identified at this time (Jesperson, 2000).

Five historic properties were located within the proposed access haul road corridor to the Fort Knox Mill (Williams, 2000). None of the sites was considered eligible for the National Register of Historic Places.

Thus, because the cultural resources identified as being potentially affected by the proposed project have been reviewed according to the protection procedures under the Section 106 process which is the accepted process by which to mitigate impacts to

cultural resources, no significant impacts to cultural resources are expected from project development.

4.14 VISUAL

Visual impacts are discussed below separately for the mine area and for the access haul road area because these largely would be seen by different populations of concern.

4.14.1 MINE AREA

Visual impacts from the perspective of properties in the Olnes and Haystack subdivisions from mine area activities are assessed according to the principles and practices as described in *Landscape Aesthetics – A Handbook for Scenery Management* (USFS, 1995). Within the context of these evaluation procedures, no significant visual impacts are assumed from mine operations. The impacts discussion below was taken primarily from Mining Public Consent (2000a).

The residents of the Olnes and Haystack subdivisions are located in the adjacent elevations west and north of the True North property, at least one or more miles in distance, north and west of the project site (4.10-4). The actual concern (sensitivity) levels of all residents in these areas has not been fully measured; however, the Proposed True North Mining Report Socioeconomic Baseline Report (Mining Public Consent, 2000a) established that some property owners in the Olnes and Haystack subdivisions could be a potentially sensitive viewing public.

Existing Visual Conditions

A visual character and quality analysis of the True North project area was presented in the visual baseline report (Mining Public Consent, 2000a). In summary, the True North mine area is located on the northwest flank of Pedro Dome in the Chatanika River watershed, and is comprised of hilly terrain with elevations ranging between 200 and 550 m (approximately 650 to 1800 feet).

Vegetation patterns in the project area have been altered by previous mining roads and activities in the True North mine vicinity, and other adjacent road and residential construction. Distant views of disturbances from the Shepherd's Drill and Test Blast

Area and Hindenburg Pit are apparent due to the disruption of natural vegetation. The contrasting lines and color of exploration terraces, roads and equipment operating at the project site have modified the surrounding landscape. Snow occurring during winter conditions contrasts strongly with the vegetation, also highlighting disturbed areas.

Distance Zones and Views

Following are definitions of distance zones and their application to the True North project area:

Foreground landscape – Up to ½ mile from Olnes and Haystack subdivisions. Content of views include residential development and associated outbuildings, local and subdivision roads, and large undeveloped areas. Views of immediately surrounding vegetation are predominant outside the residential areas, providing contrast and variety to cleared and developed areas.

Middleground landscape – ½ to 4 miles from the two subdivisions. A variety of residential development patterns, roads, undeveloped hilly terrain and existing True North mine area disturbances are contained in these areas. Some properties in Olnes Subdivision along Luneberg Road (within 1- 1½ miles of the mine site) have relatively unobscured views of the True North mine area's west ridge, while some properties in Haystack Subdivision (within 4 miles of the project area) have more obscured views of the mine site due to distance, topography, and vegetation.

Background landscape – Distant views over 4 miles. Because of location, terrain and topography, the distant views are not particularly strong or vivid. There are no large distant mountain ranges viewable from Olnes Subdivision, and only a relatively few areas high in the Haystack Subdivision have such views. The terrain is rounded landforms, with some contrasting vegetation, but limited variety of colors, textures, and vividness.

Scenic Integrity

The affected area has been altered. Residential homes, roads and associated residential development are all significant elements in views. The existing mine roads, exploration benches and other related activities at the mine site area also are more distant view elements. The overall project area has been disturbed to varying degrees

and is evident to foreground, middleground and distant viewers. The immediate Olnes and Haystack subdivision areas provide a “low to moderate” scenic integrity, while middleground and distant views provide a “moderate” level of scenic integrity.

Evaluation

In the absence of more complete documentation and analysis of sensitive viewing constituents, and appropriate visual simulations and analysis of proposed mining activities, it is concluded:

- Because of its relative proximity, Olnes subdivision residents would be cognizant of visual changes in the landscape due to the True North project. However, several of the proposed activities affecting their middleground views would be occurring on the east side of the mine site, obscured by distance and topography. The visual impacts from True North project development are assumed to be not significant.
- Haystack subdivision residents have middleground and distant views of the True North project. Unlike Olnes residents, they are located on the north side of the Chatanika River Valley, with a much longer viewing distance. Because of their distanced middleground views (approximately 4 miles or greater), it is assumed that the proposed project development would not have significant visual impacts.

4.14.2 ACCESS HAUL ROAD

Visual impacts in the access haul road area are assessed according to the principles and practices as described in *Landscape Aesthetics – A Handbook for Scenery Management* (USFS, 1995). Within the context of these evaluation procedures, there would be no significant visual impacts from construction and operation of the access haul road. The impacts discussion below was taken from LDN, 2000.

From a historical perspective, the area in the vicinity of Cleary Summit has been actively mined for decades and the Fort Knox Mine is active. There should probably be some recognition that the presence of a significantly high number of mining claims in the area indicated that there were possibilities of mineral development in the area and that traffic generation would logically accompany that development.

From the perspective of residents of the Cleary Summit area, the lowest “acceptable levels of quality” would certainly be anything that leads to major distractions from the view of aurora or other night viewing. Anything that would result in lower visitation by tourists would also be unacceptable to those who have lodges or bed and breakfasts.

There also would be strong exception to substantial plumes of dust that could lead to degradation of daytime viewing in the summer as well.

Acceptable levels of visual quality for the visitor public could not include anything that distracted substantially from the aurora viewing. Direct glare from headlights in foreground views or for long periods of time in the middle ground distance would be considered distracting. Considerable dust in the summer would also be a major distraction in the foreground.

4.14.3 LANDSCAPE VISIBILITY

Cleary Summit and adjacent neighborhoods were considered the areas of most concern to a sensitive viewing public.

Landscape Visibility consists of three elements:

- Use area
- Concern level
- Distance zones

For Cleary Summit, the use area represents high use, both by residents and tourists. The concern level of these users is high, both because residents have purchased homes in order to enjoy the views, but also because visitors to the area also typically have high expectation levels. With this in mind, a summary of scenic classes as it relates to Cleary Summit may be characterized as follows:

- Foreground Views (up to ½ mile distance) -- Foreground view areas provide a "High" Concern Level on the part of viewers. The Scenic Attractiveness of this zone is "Indistinctive." This provides an overall Scenic Class rating of "1" with an Existing Scenic Integrity rating of "Low to Moderate."
- Middleground Views (up to 4 miles distance) -- Middleground views have a "High" Concern Level on the part of viewers. The Scenic Attractiveness of this zone is "Indistinctive." This provides an overall Scenic Class rating of "2" with an Existing Scenic Integrity rating of "Moderate."
- Background Views -- Background views have a "High" Concern Level. The Scenic Attractiveness of this zone is "Distinctive" providing an overall Scenic Class rating of "3" with a "High" level of Scenic Integrity.

Opportunity Spectrum

The US Forest Service evaluates its land management objectives within a zonal classification called “Recreation Opportunity Spectrum” (USFS, 1995). This represents the spectrum of uses within which activities occur in the landscape and the “evidence of humans.” This then helps the management of lands, recognizing current use on the land and the setting in which it occurs. This also helps determine whether specific uses are appropriate within the setting and spectrum in which they occur. The evaluation considers issues such as size of the area being evaluated, its remoteness, the evidence of humans, the type and number of encounters, and the managerial setting.

The Cleary Summit area would be classified within the Recreation Opportunity Spectrum as a “Rural” area. This suggests that modification to the area would be expected. Table 4.14-1 depicts Scenic Integrity Objectives as classified by the U.S. Forest service (1995).

Evaluation

The evaluation of impacts addresses three views from Cleary Summit. The first is from the neighborhood located west of the Steese Highway (Cleary Summit Subdivision). The second is from residences and bed and breakfast establishments located just east of the Steese Highway (Skiland Subdivision). The third is from the Skiland parking lot where the majority of aurora viewing takes place.

Summer

All access haul route alternatives, including FGMI’s preferred access haul road (Alternative 5), would provide an alignment that would largely be within middleground view areas. The location of FGMI’s preferred alternative has been altered through the public review process to remove almost all foreground views from the key sensitive viewpoints. The middleground is a zone that has been modified over time. From all three viewpoints defined above, existing views include roadways and other intrusions into the natural landscape. This is an area that has been managed over a period of time in a way that would be considered to be a “rural” area as opposed to a “primitive” or “natural” area. The viewing public is highly sensitive to change in the area as reflected in the “constituent” and “landscape visibility” evaluations. Still, the modification of the

roadway and the frequency of truck traffic (1 truck per 4 minutes) still would fall within the expectations of a rural setting.

Table 4.14-1

Scenic Integrity Objectives

Recreation Opportunity Class	Very High	High	Moderate	Low	Very Low
Primitive	Norm	Inconsistent	Unacceptable	Unacceptable	Unacceptable
Semi Primitive Non Motorized	Fully Compatible	Norm	Inconsistent	Unacceptable	Unacceptable
Semi Primitive Motorized	Fully Compatible	Fully Compatible	Norm	Inconsistent	Unacceptable
Roaded Natural Appearing	Fully Compatible	Norm	Norm	Norm	Inconsistent
Rural	Fully Compatible	Fully Compatible	Norm	Norm	Inconsistent
Urban	Fully Compatible	Fully Compatible	Fully Compatible	Fully Compatible	Not Applicable

Perhaps the most substantial concern would be for dust that would be generated. This could be an annoying and distractive feature if dust control mitigation were not implemented. As discussed in Section 2.3.21 (Mitigation), however, FGMI would control dust using several mitigation measures. Overall, the summer impacts of the new road and associated traffic would be of minor visual significance from any of the three views.

Winter

Cleary Summit Subdivision -- Key views from this subdivision would be to the east. A view would be afforded of a road following the terrain at a distance of over ½ mile, below the existing Fish Creek Road. Vehicle lights would not shine directly into windows, thus most light that would be seen would be incidental. Winter visual impacts from this location should be considered of negligible significance. Figure 4.14-1 presents the existing view and a simulation of a view with the access haul road for Alternatives 3 and 5 (FGMI's preferred alternative) from a residence at Cleary Summit Subdivision.

Skiland Subdivision -- Key views from this location are to the south, looking towards Fairbanks and the Alaska Range. All access haul route alternatives, including FGMI's preferred access haul road (Alternative 5), would provide middleground views of the road and traffic. The primary concern would be for lights that could shine through windows. The total amount of time that a truck would be visible from this location, assuming a travel speed of 30 mph, would be approximately two minutes for a viewer looking to the west and approximately one minute for a viewer looking to the south.


Existing view from Cleary Summit Subdivision looking Southeast (Alternative 1)


Alternatives 3 and 5
Proposed route

Figure 4.14 - 1

When looking west, for approximately one minute of the time that traffic would travel from west to east, headlights would produce glare as a result of being within 10-degrees of the direct horizontal view of the road. This would be at a distance that varied from ½ mile to one mile distant from the affected area. When looking south, for approximately one minute of the time that traffic would travel from east to west, headlights would produce glare as a result of being within 10-degrees of the direct horizontal view of the road, possibly producing noticeable glare. The distance would be slightly less than ½ mile. The remainder of the time that trucks would travel the road, in either direction, light would be incidental, not direct light.

This view from this area is not distinctive at night on most occasions. The night sky is primarily dark, thus, reflections from windows in interiors are dominant. The distant lights generally are visible if interior lights are off. This may be the situation on those many nights that the aurora is visible. However, primary aurora viewing is to the north, northeast and northwest, not to the south and west in the direction of the access haul road. This is evidenced by the additions that have been provided on buildings to enable visitor viewing of the northern lights in addition to the orientation of the key viewing opportunity provided at the Skiland parking lot.

Still, aurora viewing is not constrained to only the north and the passage of trucks with headlights at an interval of every four minutes would be distracting for those times that residents or visitors view the aurora to the south. It could also be somewhat distracting to a relatively minor degree on those nights that interior lights are on and the dark background is punctuated by headlights at intervals. Still, the distance would be slightly less than ½ mile. Overall visual impact would be of minor to moderate significance, primarily based on the sensitivity of the viewers. Figure 4.14-2 presents the existing view, and two simulated views, from Cleary Summit Bed and Breakfast in the Skiland Subdivision of the access haul road for Alternatives 1 (existing view), 5 (FGMI's preferred alternative), and 2, respectively.

Skiland Parking Lot -- The Skiland parking lot is used for aurora viewing by those staying at bed and breakfasts/lodges in the area, as well as by visitors/tourists traveling from Fairbanks lodging establishments. The parking lot is generally oriented to the west/northwest. Buildings and a slight rise in the topography generally block views to

the south. FGMI's preferred access haul road (Alternative 5) would be located at the far western viewing area from the parking lot. The only portion of the road that would be visible would be approximately ¾ mile distant.

This parking lot is in an area that is subject to occasional destination bound (not through) traffic on winter nights. It is in a developed area with structures nearby. It is not a primitive site by any measure, and occasional lights are visible currently from the Steese Highway. The impact of traffic from the preferred alternative would be of negligible significance from this location. Figure 4.14-3 presents the existing view, and a simulated view, from the Skiland parking lot of the access haul road for Alternatives 3 and 5 (FGMI's preferred alternative).

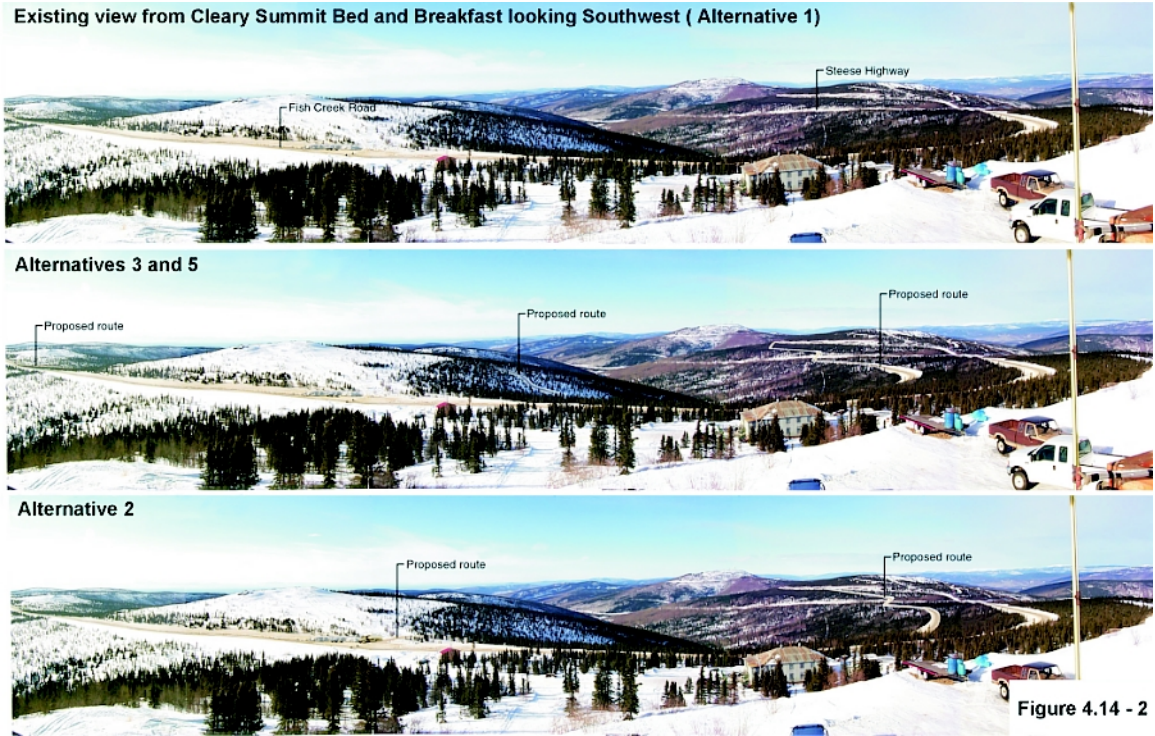

Existing view from Cleary Summit Bed and Breakfast looking Southwest (Alternative 1)
Steese Highway
Fish Creek Road
Alternatives 3 and 5
Proposed route
Proposed route
Proposed route
Alternative 2
Proposed route
Proposed route

Figure 4.14 - 2

Existing view from Skiland Lodge looking Northwest (Alternative 1)

Alternatives 3 and 5

Figure 4.14 - 3

4.15 RECREATION

Significance of impacts to recreation was determined within the context of whether such impacts could be minimized and mitigated by FGMI. Within that context, there would be no significant impacts to recreation in the project area from development of the True North project.

Activity at the True North mine site would impact recreationists using the Pea Run Trail if not mitigated. This trail passes directly through the Hindenburg and East pits. FGMI has agreed to mitigate this impact by improving access from upper Little Eldorado Creek drainage between Last Chance and Louis creeks if authorization from the private landowner is acquired by the Chatanika Lodge operator who initially established the snowmobile route across private land.

The applicant's preferred access haul route would cross the existing alternate Cleary Summit/Gilmore Dome Trail that parallels Fairbanks Creek Road at three points. FGMI would provide trail signs at each crossing to warn trail users of road traffic and additional road signs to warn drivers to watch for trial users (e.g., snow machines, ATVs, mountain bikers, hikers, etc.). This alternate Cleary Summit /Gilmore Dome trail was constructed by FGMI in 1995 to mitigate potential safety conflicts between trail users that used the Fairbanks Creek/Fish Creek roads and traffic when the company upgraded the Fairbanks Creek/ Fish Creek roads to provide access to Fort Knox. The existing trail near Barnes Creek Road likewise would be impacted by the applicant's preferred access haul route if not mitigated. FGMI also would provide signage for this trail crossing.

Fourwheelers, hunters, and berry pickers would not be significantly affected by the proposed True North development. Some very good blueberry patches are located in the vicinity of the proposed True North Mine, but these are supplemented by many more such patches in this part of the Interior.

Except for an approximately 2500 segment on the existing Pedro Dome / True North Road, the rest of the access haul road would be new, and private. Therefore, there would be little impact on existing public recreational use of rights-of-way in the project area. The 2500 feet of the existing Pedro Dome / True North Road over which the ore

trucks would travel would be shared with public users. Except for that segment, however, the remainder of the road would remain essentially unchanged and available for public use as at present.

Potential impacts to aurora viewers and sight-seers are discussed in Section 4.14 (Visual Resources).

4.16 TRAFFIC

Significance of impacts to traffic was determined within the context of the design capacity of the existing and new roads that would be used during construction and operations, and on ADOT/PF safety criteria. Because the access haul road would be private, exclusive, with only mine-related traffic, because all existing mine traffic would be removed from the upper Steese Highway and Fairbanks Creek Road, because additional mine-related traffic using the Steese Highway would small and well within the design capacity of the highway, there would be no significant impacts on traffic in the project area from development of the True North project.

Due to seasonal, weather, and operational variations in haul rates, ore trucks would make between 100 and 190 round trips per day from the True North Mine to the Fort Knox Mill on the new haul road. The road would be private, exclusive, and only True North and Fort Knox traffic-related vehicles would use it. Using the higher 190 round trips per day figure, an ore truck would pass a given point approximately every 3.75 minutes.

Traffic related to either the True North or Fort Knox mines would use the access haul road rather then the existing Fairbanks Creek or Pedro Dome / True North roads for access. Approximately 348 vehicle trips per day of Fort Knox Mine traffic presently using Fairbanks Creek Road immediately in front of the Cleary Summit residential area therefore would use the new haul road approximately 690 feet further away, and 200 feet lower in elevation, than Fairbanks Creek Road.

Estimated future traffic on the access haul road east of the Steese to the Fort Knox Mine would include a maximum of approximately 380 ore truck trips, plus the approximately 348 present vehicle trips on Fairbanks Creek Road, for a total of

approximately 728 vehicle trips per day. Estimated future traffic on the access haul road west of the Steese to the True North Mine would include the same maximum of approximately 380 ore truck trips, plus approximately 94 other mine-related vehicle trips, for a total of approximately 474 trips.

Thus, while there would be an overall increase in traffic in the vicinity of Cleary Summit, the removal of approximately 348 vehicle trips per day away from the Cleary Summit residential areas would very significantly reduce traffic close to these residences.

Approximately 428 vehicle trips per day would be made by workers and service vehicles to and from the True North Mine. They would leave the Steese Highway via an exit ramp and enter via an entrance ramp that would minimize any effects on other Steese traffic.

The approximately 94 non-ore truck vehicle trips per day using the access haul road to the True North Mine would also use the Steese Highway. The Highway Capacity Manual, Special Report 209 (Transportation Research Board, 1994) lists the maximum allowable service flow rate (capacity) under ideal conditions for a two-lane highway as 2,800 passenger cars per hour. To arrive at a realistic capacity for the specific stretch of the Steese Highway between Fox and Cleary Summit, factors such as average terrain, geometric, and traffic conditions (e.g., vehicle composition, no passing zones, directional traffic distribution, and lane and shoulder width) must be accounted for. Using the "General Terrain Methodology," from the Highway Capacity Manual, CH2M Hill (2000) calculated two adjusted capacity values for this stretch of highway. The first, using the most conservative estimates for terrain and geometric conditions, yielded a capacity of 4,969 vehicles per day. The second, using more realistic estimates, yielded a capacity of 9,758 vehicles per day. The capacity volumes were determined in terms of maximum average annual daily traffic (AADT).

Based on the maximum capacity calculations above, and the AADT values in Table 3.22-1, the 1999 AADT for this stretch of the Steese Highway was between 13 and 26 percent of the highway's capacity. The daily traffic increase of 94 vehicles that would be attributable to development of True North would increase the 1999 AADT to 1,388 vehicles, an average daily traffic increase of approximately 7 percent. This would

increase the 1999 annual traffic volume from between 13 and 26 percent of the highway's capacity to between 14 and 28 percent, depending on which adjusted capacity value is used. This would leave between approximately 72 and 86 percent of the Steese Highway's traffic capacity between Fox and Cleary Summit unused. Thus, increased traffic from development of True North would not be significant within the context of the highway's design capacity.

While not applicable to the ore haul trucks which would never drive on the Steese Highway, larger vehicles such as fuel trucks from Fairbanks bound for the True North Mine would turn right off the Steese onto the access haul road, and then turn west and cross under the highway. This would avoid large vehicles having to stop on the Steese Highway itself while waiting for oncoming traffic to pass before turning left off the Steese onto the access haul road to the mine.

The traffic mitigation measures described in Section 2.3.21 (Mitigation) would be implemented to reduce impacts. These measures also will be included in FGMI's transportation plan.

4.17 LIGHT POLLUTION

The mitigation measures described in Section 2.3.21 (Mitigation) to reduce light pollution would minimize the effects of project development on residents and other receptors in the project area. There would be no significant effects from stationary light sources.

Because truck lights moving within view the Cleary Dome-based northern lights viewing operation in winter likely would alternately be very visible when directed at the facility, and then considerably less visible when moving in other directions, constant light pollution such as from vehicle lights would not occur. Thus, interference with viewing aurora displays would be sporadic and on an absolute basis occur during a relatively small portion of a given display. The truck lights, however, particularly in that they would be moving, could constitute a distraction to viewers. Such distraction would be similar to that from existing traffic on the Steese Highway and on Pedro Dome and Fairbanks Creek roads. Section 4.14.2 (Access Haul Road) discusses visual impacts to Cleary Summit residents from night traffic on the access haul road and concludes that

overall visual impact would be of minor to moderate significance, primarily based on the sensitivity of the viewers

Approximately 348 vehicle-trips per day of Fort Knox Mine traffic presently using Fairbanks Creek Road immediately in front of the Cleary Summit residential area, however, would be diverted to use the new haul road approximately 690 feet further away and 200 feet lower in elevation than Fairbanks Creek Road.

A concern has been raised that traffic on the access haul road right-of-way might produce light pollution that could affect the mission of the Poker Flats rocket research facility, located approximately five miles north of Cleary Summit. This facility would not be able to see lights from vehicles in the right-of-way. The right-of-way would be below Cleary Summit on the south, and the Poker flats facility is at least 1,300 feet below Cleary Summit on the north. Moving the existing Fort Knox Mine-related vehicle traffic from Fairbanks Creek Road, virtually right on the summit, to the lower access haul road right-of-way likely would reduce potential light pollution effects on the facility.

Thus, within the context of existing traffic capacities in the Cleary Summit area, and the removal of substantial present Fort Knox Mine traffic from Fairbanks Creek Road, light pollution from True North ore trucks would not be significant.

The traffic-related light pollution mitigation measures described in Section 2.3.21 (Mitigation) would be implemented to reduce impacts. These measures also will be included in FGMI's transportation plan.

4.18 FORT KNOX MINE

The significance of effects on the Fort Knox Mine project from development of the True North project is considered within the context of adherence to the Fort Knox Mine's state and federal leases and permits. Within this context there would be no significant effects from development of the True North project.

The Fort Knox Mine project is presently self contained in that the mill receives all its feed directly from the adjacent mine pit. Therefore, for the purposes of this discussion, the Fort Knox Mine project boundary is considered to be the area defined by the project's millsite lease. Effects from hauling the ore between the True North Mine to the

Fort Knox Mill, i.e., outside the boundary of the Fort Knox project, are discussed above and in Section 4.20.

By the nature of the True North project, higher grade ore would be trucked from the True North Mine to the Fort Knox Mill and used as mill feed, ton for ton, in lieu of lower grade ore from the Fort Knox pit. Thus, within the Fort Knox project's boundary, the same volume of True North ore merely would be handled and treated in the same manner as the displaced Fort Knox pit ore. Thus, with respect to effects on the Fort Knox project and its existing state and federal leases and permits, there logically would be no significant differences in effects. For two aspects, however, tailings impoundment capacity and tailings impoundment water quality, further discussion is warranted.

4.18.1 TAILINGS IMPOUNDMENT CAPACITY

Because the same volume of True North ore would be handled and treated in the same manner as the displaced Fort Knox pit ore, there would be no significant difference in the volume of ore deposited in the Fort Knox tailings impoundment during operation of the True North project. If the reasonable assumption were made, however, that the same amount of ore from the Fort Knox pit ultimately would be processed and deposited in the tailings pond whether or not the True North project were developed, then consideration must be given to the potential impact of True North's additional 7.2 million tons of ore on the ultimate volume of tailings cumulatively deposited in the impoundment.

The Fort Knox Mine's tailings impoundment's original design capacity was approximately 200 million tons, and it was built for that capacity. Because operational experience has shown better than expected compaction of the tailings in the impoundment, the present capacity is estimated at approximately 210 million tons. During the first three and a half years of operation, approximately 13 million tons of tailings per year were deposited in the impoundment. Thus, the impoundment currently contains approximately 46 million tons of tailings. This means approximately 164 million tons of capacity are still available now without enlarging the impoundment's permitted footprint. Thus, True North's volume of 7.2 million tons could be easily held by the Fort Knox impoundment.

The effect of adding the approximately 7.2 million tons of True North ore to the impoundment, assuming all Fort Knox ore were already in the impoundment, would be to raise the ultimate level of the surface of the deposited tailings approximately 4.9 feet at the upstream face of the impoundment's dam. This would increase the surface area of deposition by approximately 22.4 acres. This would amount to percentage increases in elevation and area of 0.3 percent and 2.4 percent, respectively.

Because these would be very minor absolute and percentage increases in height and area, and because the True North tailings volume would account for only 3.4 percent of the already constructed and permitted impoundment's capacity of 210 million tons, the deposition of the additional True North tailings would not have a significant effect on the Fort Knox Mine project.

4.18.2 TAILING IMPOUNDMENT WATER QUALITY

Tailings from the Fort Knox Mill presently are deposited in the tailings impoundment under the terms of ADEC Solid Waste Disposal Permit 9931-BA011 which contains the standards that must be met for continued deposition of tailings. This permit, however, does not allow for processing and deposition of ore from deposits other than Fort Knox. FGMI has requested a modification of this existing permit to allow compatible ore from satellite pits to be trucked into the Fort Knox Mine for processing and deposition in the Fort Knox tailings impoundment. ADEC has proposed modifying the existing permit to allow for such compatible ore to be processed at Fort Knox.

The proposed modified waste disposal permit (0031-BA008) establishes a series of procedures that must be followed for ore from satellite pits to be processed such that the ADEC can determine that, "…there will be no impact on mine closure, reclamation, or water quality." Thus, by its own terms, the permit requires that there be no significant impact to mine closure, reclamation, or water quality. If ADEC therefore determined that a significant impact were occurring, the True North ore could no longer be processed. Thus, within the context of its solid waste disposal permit, Fort Knox tailings impoundment water quality would not be significantly affected by development of the True North project.

4.19 NO-ACTION ALTERNATIVE

Under the no-action alternative, the True North project would not be developed now. Conditions and activities in the Dome and Little Eldorado Creek drainages would continue as they currently are, as described in Chapter 3 (Affected Environment). This alternative may be used as a baseline for comparison with the other alternatives.

Under this alternative, both the negative and positive effects of the proposed project would not occur. The upper Dome and Little Eldorado Creek drainages would not sustain the impacts of surface disturbance to uplands and wetlands, wildlife displacement, noise, traffic and human activity, and nearby residents and recreational users would not experience traffic, noise and visual impacts. Conversely, a substantial number of project-related jobs would not be created, nor would their concomitant economic benefits.

4.20 CUMULATIVE IMPACTS

A cumulative impact "is the impact on the environment, which results from the incremental impact of the action when added to other past, present, and reasonably foreseeable future actions regardless of what agency (federal or non-federal) or person undertakes such other actions. Cumulative impacts can result from individually minor but collectively significant actions taking place over a period of time" (40 CFR § 1508.7).

Cumulative impacts must be considered along with direct and indirect impacts in determining whether the environmental impacts of a project are significant and thus require preparation of an environmental impact statement (EIS). Arguably, based on a seminal U.S. Supreme Court decision and recent case law, a cumulative impacts analysis as to possible future development of the five below described FGMI satellite ore deposits currently in various stages of exploration is not required in this case for the following reasons:

- There is no FGMI proposal to develop the potential satellite deposits now being explored, either as a unit or sequentially, nor is there a proposal to develop any individual satellite deposit. This is because the information to do so is not currently obtainable because no satellite deposit, other than True North, is sufficiently far enough along in the exploration process to provide

such information. Thus, none of the satellite deposits has met the FGMI criteria described below to be a "proposal."

- Because it can take up to ten years to permit a project from the time it is identified as a satellite deposit, and because it is dependent on numerous conditions, each of the satellite deposits considered in this section must be considered "speculative" at this time.
- The facts of record show that to the extent information is available, each satellite deposit will be independently viable (if at all) and is not dependent on the development of the True North deposit nor any other satellite deposit.
- The scope of the COE's jurisdiction in the True North project is limited to the wetlands impacts (not uplands impacts) of the road and the pit developments.

Nevertheless, because an action that is not sufficiently developed to be a "proposal" might under certain circumstances be considered to be "reasonably foreseeable," this Section 4.20 considers the current estimates of the environmental impacts of the five satellite deposits currently in various stages of exploration in addition to the direct and indirect impacts of the True North proposal to determine whether the impacts would be significant and thereby require an EIS. The analysis below shows that for various reasons the cumulative impacts of the five satellite deposits, when combined with the direct and indirect impacts of the True North project, are not significant and thus an EIS is not required.

4.20.1 Area of Potential Direct Impact (Project Area)

FGMI has applied to the COE for a revision to its CWA § 404 Murray Creek 2 permit to construct an access road and to develop the Hindenburg and East pits in approximately 78 acres of low value wetlands. The road and pit are on state and Mental Health Trust lands and are being developed with private funds.

Under 33 CFR Part 325, Appendix B, paragraph 7, the COE's permitting jurisdiction over the True North project is circumscribed by the road and pits. The direct environmental impacts resulting from this development will occur in the area tributary to the road and pits. This area of potential direct impacts is referred to in this document as the "True North project area," and is shown in Figure 1.2-2.

Consistent with the definition of “cumulative impact,” “The impact on the environment which results from the incremental impact of the action . . .,“ should primarily be the area surrounding the only “action” proposed, which is construction of the True North access haul road and development of the Hindenburg and East pits and delivery to the Fort Knox mill. (See 40 CFR § 1508.7) Defining this is as the “project area” is also consistent with the COE’s jurisdiction in this matter as described above.

Where the context requires it (e.g., socioeconomics, wetlands, air), and to the extent environmental impact information is available, this document analyzes the potential impacts of the satellite deposits outside the True North project area as well as within it. In such a case the area of impact has been described in the section, e.g., for wetlands, satellite deposit impacts have been described by hydrologic drainage.

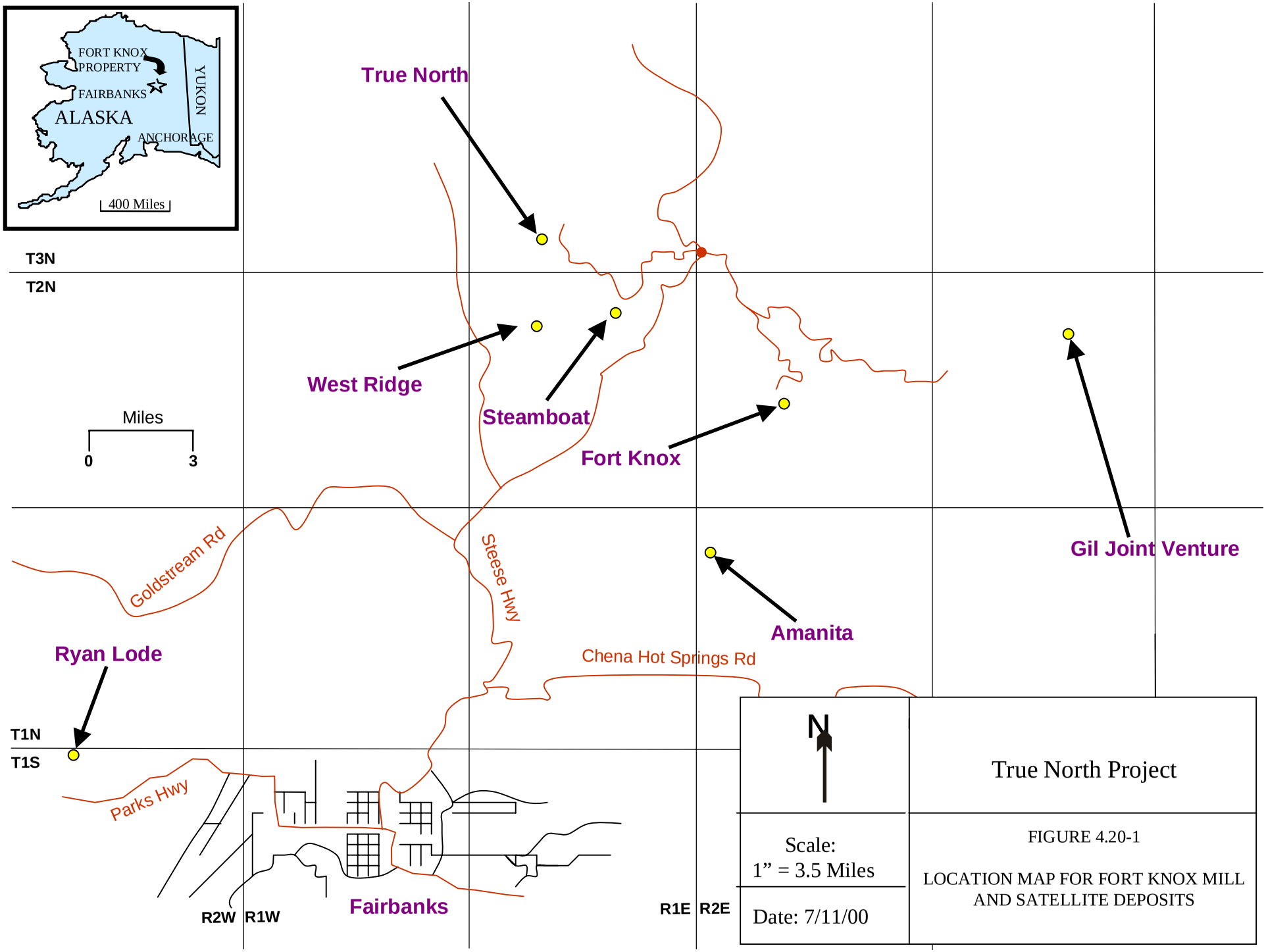
4.20.2 STEPS FOR BECOMING A PROPOSAL

FGMI is currently exploring for new ore within its 58,000-acre claim block on state land primarily northeast of Fairbanks, which is in an area in which the State’s Tanana Basin Area Plan generally designates minerals as a primary use, and which the FNSB Comprehensive Plan designates as having “High Mineral Potential” (See Section 4.12). During the normal ten year period it takes to permit a mine (from the date the exploration program locates and defines a sufficient ore body), FGMI may obtain enough information to develop a plan and seek to permit one or more mines in this claim block and move the ore from such mine(s) to the Fort Knox Mill depending on whether exploration results meet FGMI’s criteria for mine development.

Exclusive of the proposed True North project, FGMI currently has five satellite deposits in various stages of exploration. The proposed True North project would mine ore from the Hindenburg and East pits. Another deposit (Central and Sheppard) is close to the Hindenburg and East deposits on the same property and thus also might prove economic with additional exploration and drilling. In addition to the True North property, FGMI and predecessor companies have expended substantial resources exploring and assessing the Ryan Lode at Ester, approximately eight miles northwest of Fairbanks and 40 road miles southwest of the Fort Knox Mill (Fig. 4.20-1). Other deposits in the region which FGMI owns outright, or in which it is a substantial owner, include Gil,

approximately eight miles northeast of the Fort Knox Mill; Amanita, approximately five miles south southwest of the mill; and Westridge/Steamboat, approximately four miles west-northwest of the mill (Fig. 4.20-1). The Central/Sheppard and the Westridge/Steamboat deposits are within the True North project area while Ryan Lode, Gil, and Amanita are outside the project area (Figs. 1.2-2 and 4.20-1). FGMI requested exploration rights at the adjacent National Oceanic and Atmospheric Administration's (NOAA) Gilmore Creek Tracking Station. That potential deposit is not considered here because FGMI's request was denied by NOAA.

Central/Sheppard is an advanced stage exploration deposit which if developed would extend the duration of the True North project as currently planned. Ryan Lode also is an advanced stage exploration deposit and is discussed in greater detail below. Exploration on the Gil deposit is continuing with results to date indicating that further exploration is warranted. The Westridge/Steamboat and Amanita deposits are still in the early stages of exploration and likely would take years to develop if the ore bodies were to prove economic after delineation.


FORT KNOX PROPERTY
FAIRBANKS
ALASKA
YUKON
ANCHORAGE
400 Miles
True North
West Ridge
Steamboat
Fort Knox
Gil Joint Venture
Amanita
Ryan Lode
Fairbanks
Miles
0
3
T3N
T2N
T1N
T1S
R2W R1W
R1E R2E
Goldstream Rd
Steese Hwy
Chena Hot Springs Rd
Parks Hwy
N
True North Project
Scale:
1” = 3.5 Miles
Date: 7/11/00
FIGURE 4.20-1
LOCATION MAP FOR FORT KNOX MILL AND SATELLITE DEPOSITS

FGMI does not have sufficient information to seek to permit any of these five satellite deposits at this time. Such information would not be available until completion of all of the following:

- Delineation of the ore body, including its size and grade, and a determination that it represents a mineable reserve
- Preparation of a plan to extract the ore and dispose of overburden and waste rock in an environmentally acceptable manner
- Development of sufficient environmental and social information to allow permits to be obtainable
- Determination of economic viability following steps 1 through 3

Based on these criteria, none of the satellite deposits is a "proposal" as that term is defined by the United States Supreme Court. Because of the time it will take to develop them and the conditions they must meet to become "proposals," none are currently "reasonably foreseeable" under the law. FGMI is not trying to permit a regional mine or any other satellite deposit -- just the True North. Thus, the impact information about the satellite deposits provided below goes beyond what the law requires so that the decision maker and public are informed to the extent information is available.

4.20.3 CUMULATIVE IMPACT ANALYSIS

While none of the five satellite deposits has yet been sufficiently defined to be considered "a proposal" capable of being permitted, in the future one or all of them, or some as yet unidentified satellite deposit within FGMI's 58,000-acre exploration area, or within the control of a third party sufficiently close to economically haul ore to the Fort Knox Mill, might be developed and would haul ore to the Fort Knox Mill. Accordingly, this analysis examines the direct, indirect and cumulative environmental impacts on the True North project area due to the True North project itself, together with assumed additional impacts to the project area from the milling of ore and its transportation using the True North access haul road, if applicable, from each of the five satellite deposits. The localized environmental impacts of mining at the satellite deposits cannot be known or described until their ore bodies are delineated and relevant, permittable ore

extraction plans are prepared. At that time, any such impacts would be discussed in the relevant NEPA and other documents associated with such a development.

Although presently unknown, potential site-specific impacts from development of the Westridge/Steamboat and Central/Sheppard deposits within the True North project area, and from Ryan Lode or any other deposit that would haul ore into the project area via the Steese Highway, may be considered to have impacts on the True North project area which are here analyzed together. The potential site-specific impacts at the three satellite deposits outside the project area are not cumulative potential impacts of the satellite deposits on the True North project area because each is too far distant from the True North project area to impact the project area.

Thus, analysis of the impacts *on* the True North project area from deposits outside the project area that would not use the Steese Highway to haul ore (Gil and Amanita) is limited to consideration of how they impact the Fort Knox Mine. Specifically, the analysis considers whether, based on current information, receipt of ore from these satellite deposits will result in a significant change to the environmental impacts described in the 1993 Fort Knox Environmental Assessment.

Because they are distant from one another and do not depend upon each other's potential infrastructure, permitting the True North project is not a prerequisite to permitting any of the other five satellite deposits, i.e., even if permits for the True North project were denied, permit applications for any of the other five satellite deposits could still be made by the company and granted by regulatory agencies. Similarly, even if the True North project proceeds as proposed, that does not necessarily mean that the satellite deposits will be mined. For example, it is unknown whether ore from any of them would even meet ADEC's anticipated Fort Knox solid waste disposal criteria. In short, there is no interdependence between the True North project and any of the largely conjectural satellite deposits not yet proposed as projects.

4.20.4 Description of Satellite Deposits and Operations

In the case of True North, its approximately 10,000 tpd ore volume would account for approximately one-quarter of the Fort Knox Mill's daily supply. Because of the capital

costs in developing satellite deposits, including the trucks to haul ore to the Fort Knox Mill, it is unlikely that more than two satellite projects would operate simultaneously except during a short overlap between projects starting up and closing down. A more likely scenario would be sequential development of satellite deposits as long as there would be sufficient reserves of lower grade ore in the Fort Knox deposit with which to blend the higher grade ores from satellite deposits. Such blending, which would increase the overall grade of the mill feed, could have a substantial positive impact on the economics of Fort Knox by converting the currently marginal and sub-economic lower grade mineral resources at Fort Knox into an economic reserve. Thus, the Fort Knox mine life based on current reserves could be extended by making its large lower grade resource economic to mine and process. As discussed below, however, such blending would not extend the mine's life past the 16 years of operation contemplated in the Fort Knox EA (FGMI, 1993).

4.20.5 IMPACTS ON THE FORT KNOX MILL

Even if the Fort Knox mine life were extended, this, of itself, would not significantly change impacts. Environmental controls and mitigation measures would continue throughout the extended life. Under some circumstances, however, the impacts could change due to the addition of new mill feed stocks from satellite ore deposits or third-party operations.

4.20.5.1. TAILINGS IMPOUNDMENT CAPACITY

Fort Knox has operated for 3.5 years to date, with another 8.2 years of operation expected if only ore from the Fort Knox pit were to be processed and deposited in the tailings impoundment. This calculates to a total of approximately 11.7 years of operation with just Fort Knox ore. Given that the Fort Knox EA contemplated 16 years of operation, there would be approximately 4.3 years of operation "available" before the originally contemplated 16 years of operation were reached.

It is difficult to determine the additional period over which the tailings impoundment and mill at Fort Knox might operate due to receipt of ore from the above named satellite deposits. It would not only depend on the unpredictable price of gold, but also on the volumes, grades, and distances from the mill of ore deposits yet to be defined at various

satellite deposits, as well as on the economics at Fort Knox itself. Ignoring the very important gold price factor, one method of estimating how long Fort Knox might function assisted by ore from the above named satellite deposits would be to determine the unused capacity of the Fort Knox tailings impoundment, assuming no change in the tailings impoundment's already permitted footprint.

The impoundment's original design capacity was approximately 200 million tons. It was built for that capacity with an expectation in the Fort Knox EA that other reserves would be found and it would operate for a period of 16 years. Because operational experience has shown better than expected compaction of the tailings in the impoundment, the present capacity is estimated at approximately 210 million tons without enlarging the impoundment's permitted footprint. During the first three and a half years of operation, approximately 13 million tons of tailings per year have been deposited in the impoundment. Thus, the impoundment currently contains approximately 46 million tons of tailings. This means approximately 164 million tons of capacity are available now without enlarging the impoundment's permitted footprint.

An estimate of the remaining Fort Knox tailings impoundment capacity can be calculated for the current operating conditions. If Fort Knox were to process an average 41,000 tpd for the remainder of the mill's useful life, that would result in approximately 15 million tpy. Assuming for this discussion that the current capacity of the permitted impoundment is 164 million tons, then the remaining life of the impoundment would be approximately 10.9 years. Of this capacity, Fort Knox with a current proven and probable reserve of 123 million tons, would account for 8.2 years. The remaining approximately 41 million tons, or 2.7 years, of tailings capacity would be available for ore from the named satellite deposits.

Table 4.20-1 presents hypothetical values for several characteristics of the named satellite deposits. While these values represent good faith, reasonable hypothetical scenarios, it must be understood that they are based on currently available information only and are thus estimates which are subject to substantial change when and if the ore bodies have sufficiently progressed through the FGMI analytic steps described above to be permitted.

The satellite deposits would be used to supplement the Fort Knox mill feed, in effect displacing ore from the Fort Knox pit in favor of ore from the satellites and deferring processing of the Fort Knox ore until a later time, but still within the 16-year mine life contemplated in the Fort Knox EA. Combined, True North with its proven and probable reserve of 7.2 million tons, and Ryan Lode with its reserve of 2.4 million tons, would account for 0.6 years of impoundment capacity. This would leave approximately 31.4 million tons, or 2.1 years, of tailings capacity available for ore from such satellite deposits as Central/Sheppard, Ryan Lode North, Gil, Westridge/Steamboat, Amanita, and/or other deposits not yet identified.

The effect of adding all approximately 40 million tons of hypothetical ore from the above deposits to the Fort Knox impoundment over time would be to raise the ultimate level of the surface of the deposited tailings (after all Fort Knox pit ore were deposited) approximately 24.83 feet at the upstream face of the impoundment's dam, and would increase the surface area of deposition by approximately 127.5 acres. This would amount to percentage

Table 4.20-1
Reserves, and hypothetical annual production, projected mine life, and extended Fort Knox Mill life for satellite deposits, as well as approximate remaining Fort Knox tailings impoundment capacity

Proven and Probable Reserves	Hypothetical Reserves	Tonnage (MM tons)	Hypothetical Tons per Year (MM tons)	Projected Project Life (Years)	Extended Fort Knox Mill Life (Years)	Approx. Remaining Capacity[6] (MM tons)
True North		7.2	3.5	2.0	0.5	34
	Central / Sheppard [1]	8.9	3.5	2.5	0.6	25
Ryan Lode		2.4	0.9	2.7	0.2	22
	Ryan Lode North [2]	1.9	0.9	2.1	0.1	20
	Gil [3]	7.1	3.5	2.0	0.5	13
	West Ridge/ Steamboat [4]	5.0	3.5	1.4	0.3	8
	Amanita [5]	7.5	3.5	2.1	0.5	1
Total		40.0			2.7	

1 Based on announced possible and resource

2 Based on announced possible and resource

3 Based on a hypothetical 300,000 ounce deposit, 0.042 opt and 10,000 tpd

4 Based on a hypothetical 300,000 ounce deposit, 0.06 opt and 10,000 tpd

5 Based on a hypothetical 300,000 ounce deposit, 0.04 opt and 10,000 tpd

6 Remaining capacity after subtracting Fort Knox current proven and probable reserves, and assuming that each preceding hypothetical reserves deposit in the list has also been mined and the ore milled at Fort Knox

increases in elevation and area of 1.7 percent and 13.4 percent, respectively, without exceeding the height or extent of the surface area contemplated in the Fort Knox EA.

Because these would be relatively small absolute and percentage increases, because the additional tailings volume would account for only 19 percent of the already constructed and permitted impoundment's capacity of 210 million tons, and because this would fill the impoundment only to its capacity, the deposition of the additional satellite tailings would not have a significant effect on the Fort Knox tailings impoundment. It would, in fact, merely bring the impoundment to the ultimate physical size it was contemplated to reach at the time of its original permitting and construction. Accordingly, even assuming receipt of ore from all of the current satellite ore bodies under exploration there would be no change in the footprint or configuration of the tailings impoundment.

Thus, based on the remaining Fort Knox tailings impoundment capacity, the existing Fort Knox Mine ore reserves and mill processing capacity, the proposed development of True North, and the potential development of the Ryan Lode and other potential (hypothetical) ore deposits discussed above, the Fort Knox Mill could operate approximately 2.7 years longer than if no satellite deposits were to be developed (the remaining 10.9 year capacity of the tailings impoundment minus the 8.2 years Fort Knox could operate using only its existing reserves). Thus, the increase in mine life of 2.7 years due to blending of satellite ore still would easily fall within the originally contemplated 16 years of operation without changing the environmental analysis made in the Fort Knox EA.

It would be possible to increase the existing 210-ton capacity of the Fort Knox tailing impoundment by cycloning tailings to remove moisture and to compact the tailings more than occurs following direct deposition. In addition, the impoundment structure could be raised, or dry tailings could be stacked in the valleys above the impoundment. However, these last two options would result in a large cost which has not been determined and are thus largely speculative at this time. Accordingly, no such project or permit modification is proposed at this time. Any such actions that would significantly increase the facility's footprint or change its configuration would trigger another COE Section 404 permitting process with its attendant NEPA review requirement along with a review of state permits.

4.20.5.2. TAILING IMPOUNDMENT WATER QUALITY

Tailings from the Fort Knox Mill presently are deposited in the tailings impoundment under the terms of ADEC Solid Waste Disposal Permit (9931-BA011) which contains the standards that must be met for continued deposition of tailings. This permit, however, does not allow for processing and deposition of ore from deposits other than Fort Knox. FGMI has requested a modification of this existing permit to allow compatible ore from satellite pits to be trucked into the Fort Knox Mine for processing and deposition in the Fort Knox tailings impoundment. ADEC has proposed modifying the existing permit to allow for such compatible ore to be processed at Fort Knox.

The proposed modified waste disposal permit (0031-BA008) establishes a series of procedures that must be followed for ore from satellite deposits to be processed such that the ADEC can determine that "there will be no impact on mine closure, reclamation, or water quality." Thus, by its own terms, the permit requires that there be no significant impact to mine closure, reclamation, or water quality. Terms of the permit require continual monitoring to assure compliance. If the required procedures are not followed ore from satellite deposits could not be processed. Thus, under the solid waste disposal permit, as modified, Fort Knox tailings impoundment water quality would not be significantly affected by development of satellite deposits.

4.20.6 SOCIOECONOMICS

Because the True North project area is defined as the area of potential direct impacts, limiting a discussion of socioeconomic impacts strictly to the project area would not present a fair picture of the true impacts. Although workers technically do earn their incomes within the project area, because of secondary impacts and multiplier effects that accrue outside the project area, any meaningful discussion of socioeconomic effects must include effects on the greater Fairbanks area. Therefore, in this section socioeconomic effects are discussed within the contexts of the project area, and then separately for the greater Fairbanks area.

4.20.6.1. PROJECT AREA

In this section, socioeconomic impacts within the True North project area are discussed in the context of changes to assessed values, and effects on businesses and the Mental Health Land Trust (MHLT). In this context, no significant negative cumulative socioeconomic impacts would result because assessed values have continued to increase during development and operation of the Fort Knox Mine, many mitigation measures could be taken to minimize impacts on aurora viewing, and substantial benefits would accrue to the MHLT.

As discussed in Section 3.16.6 (Economic Activity in the True North Study Area), overall assessed land values in the Cleary Summit and Skiland subdivisions have increased steadily during the past ten years. For both subdivisions, the major increase in assessed values occurred during the five-year period from 1994 to 1999. These were an annual average of 4.96 percent for the Cleary Summit Subdivision, and 4.65 percent for the Skiland Subdivision. This period coincided with the construction and operation of the Fort Knox Mine. While assessed values depend on several factors, a reasonable interpretation would be that the Fort Knox project has not significantly affected land values in these two subdivisions. A reasonable presumption also could be made that operation of the True North project also would not significantly affect future assessed values, especially considering that it would remove approximately 348 vehicle trips from Fairbanks Creek Road immediately in front of the Skiland Subdivision. Continued operation of the Fort Knox Mill for an additional 2.7 years would not significantly affect assessed valuations given the history of assessment increases during the past ten years.

Section 3.16.6 also discussed in detail potential impacts to aurora viewers, and concluded that by applying various mitigation measures, impacts could be reduced. As discussed in greater detail below in Section 4.20.6 (Traffic), cumulative headlight impacts from ore trucks from an out-of-project area deposit hauling to the Fort Knox Mill via the Steese Highway would be substantially less than for ore trucks from the True North mine because the former would use only the access haul road on the east side of the Steese to Fort Knox, thereby substantially reducing the time period that lights would shine towards the Cleary Summit area.

For other businesses in the Cleary Summit area there also would be no substantive impacts. Use of the Steese Highway underpass would allow Steese traffic heading to Cleary Summit or points north to continue as before. As discussed in Section 4.20.7 (Traffic) below, if ore were to be hauled from a satellite deposit outside the project area to the Fort Knox Mill via the Steese Highway, a vehicle heading north on the Steese would, at approximately 15 minute intervals, have to drive behind an ore truck going uphill at a slower speed than normal traffic. While this might be somewhat frustrating, it is very unlikely that this would have other than a minor impact on travelers heading to commercial destinations at Cleary or farther north.

The State's MHLT would receive approximately $25,000 from sale of an approximately five-mile long right-of-way across trust lands for the access haul route. It likely also would receive up to $100,000 from sale of approximately 100,000 yds^3 of rock for road construction. In addition, the MHLT also could receive a significant benefit. The trust owns the land under the Fort Knox Mill and presently receives an approximately $150,000 annual rental for use of its lands by the mill, with that amount adjusted annually for inflation. Processing of ore from the True North Mine would extend the life of the Fort Knox Mill. Under the scenario described in Section 4.20.3, development of the True North project would extend the life of the Fort Knox Mill for approximately one-half year past the point where the Fort Knox pit's ore reserves would be depleted, benefiting the MHLT by an additional $75,000 in constant 2000 dollars.

4.20.6.2. GREATER FAIRBANKS AREA

Cumulative socioeconomic impacts in the greater Fairbanks area are viewed within the context of longer term changes to existing levels of population, employment, income, housing, services, and local government taxes and budgets in the greater Fairbanks area. In this context, no significant negative cumulative socioeconomic impacts would result because current and projected socioeconomic conditions in the Fairbanks area show that Fairbanks could generally absorb satellite projects without significant effects. These projects would, indeed, provide tangible economic benefits to the community.

In addition to the direct economic benefits from development of an individual satellite mine such as True North, overall lengthening of the life of the Fort Knox Mine would continue the mine's well documented significant economic benefits to Fairbanks, and more generally to the state. Blending higher grade ore from the satellites with the lower grade Fort Knox ore will better insulate the Fort Knox project from the vagaries of gold prices, thus better insuring workers' jobs and other community economic benefits. McDowell Group (1999) found that the Fort Knox Mine's approximately 260 employees earned approximately $13.3 million in payroll in 1998. If other small mine deposits in the Fairbanks area were developed they would provide continued mining-related jobs. Because the satellites likely would be developed sequentially, workers would be drawn largely from the existing FGMI work force by moving from job to job. A relatively small number of new employees would be expected. Such projects would be small in size and relatively short-lived. The current socioeconomic conditions in the Fairbanks area, as described in Section 4.11 (Socioeconomics), show that Fairbanks could generally absorb such projects without significant effects.

Besides its payroll, the mine spent another $32 million in Fairbanks on goods and services in support of its operations. With a 1998 assessed value of $253 million, the Fort Knox Mine paid $3,916,845 in property taxes out of total 1997 borough property tax revenues of $48,313,435. This represents approximately 8 percent of total FNSB property tax revenues. Thus, in nominal 1998 dollars, development of satellite deposits could extend the life of the Fort Knox Mill by approximately 2.7 years as discussed

above in Section 4.20.2, the Fort Knox project would pay approximately $36 million payroll, $10.6 million in property taxes, and $86 million in purchase goods and services.

4.20.7 AIR QUALITY

The potential cumulative impacts to air quality from the satellite deposits are considered within the context of the regional air shed and not just within the project area. This is because local impacts on ambient air can be borne great distances and are not substantially limited by geographic boundaries.

For the near- and mid-term, GVEA has ample existing power reserves to support additional projects such as True North, the satellites and an extended Fort Knox project life. With the addition of both the Healy Clean Coal project and the planned upgrade of the power line to bring power from south central Alaska to the Interior, no reasonably foreseeable project would be required to develop additional power sources that might cause significant cumulative impact to air quality.

Application of the mitigation measures described earlier in Section 4.9.1 (Fugitive Sources) would result in an insignificant release of fugitive dust from True North, as well as Central/Sheppard and Westridge/Steamboat. For this reason, the short-lived nature of these satellite deposits (if developed), and because of their locations at a substantial distance from other reasonably foreseeable projects that might produce fugitive dust, the True North and satellite deposits would have no significant cumulative impact on fugitive dust emissions.

For the same reasons as discussed in Section 4.9.2 (Air Quality), emissions from mobile equipment (loaders, trucks, drill) would not result in significant impacts to ambient air quality. Because of the likely sequential development of these deposits (with a short period of overlap), emissions would not be additive, but rather would simply shift in location as one project shut down and another began.

4.20.8 WETLANDS

Potential wetlands cumulative impacts resulting from development of the satellite deposits are discussed separately below both within and outside the True North project

area. This is because possible future loss of wetlands from development of satellite deposits must be considered within the context of the hydrologic drainages within which the loss might occur, and these drainages constitute the units encompassing the water, air, soil, and elevation factors that affect wetland communities.

4.20.8.1. PROJECT AREA

Development of the Central/Sheppard and Westridge/Steamboat deposits within the project area would cause disturbance to wetlands at the mine sites (the mine pits, roads, and the maintenance complexes) and along some road corridors from the satellite deposits to the Fort Knox Mill (new roads, or possible widening of existing roads). The absolute extent of disturbance cannot be determined at this time because of many unknown factors, e.g., the specific routes of new roads. FGMI has, however, estimated areas of hypothetical development disturbance to wetlands at Central/Sheppard and Westridge/Steamboat, excluding access roads. These are presented in Table 4.20-2. While these values represent good faith, reasonable, hypothetical scenarios, it must be understood that they are simply best estimates based upon currently available information.

Central/Sheppard, which is adjacent to the True North deposit, should be considered together with the True North wetlands impacts because they both are located in the same Dome and Little Eldorado creeks / Chatanika River drainage. Westridge/Steamboat however, while in the True North project area, is within the Pedro Creek / Goldstream drainage that does not merge with the Chatanika River drainage until some 40 miles westward in Minto Flats.

Central/Sheppard -- Table 4.20-2 shows that approximately 32 acres of wetlands, of a total area of approximately 91 acres, would be disturbed if the Central/Sheppard area deposit were to be developed under this hypothetical scenario. Wetlands thus would constitute approximately 35 percent of the total disturbed area for this deposit. This compares to the approximately 66 acres of wetlands disturbance (27 percent of total disturbance) expected from mine site development at the proposed True North project.

For both the Central/Sheppard and True North deposits, similar wetlands are very common not only in the project area and throughout the upper Chatanika River

drainage, but as well throughout interior Alaska. These wetland types are generally considered low value wetlands . High value wetlands such as emergent marsh, riparian habitats, or open water are not found in the area that would be disturbed by development of either deposit. Thus, no wetlands considered “high value” would be disturbed by development of the Central/Sheppard or True North deposits.

Table 4.20-2

Disturbance to wetland and upland areas, based on national wetlands inventory (NWI) maps, from hypothetical site development layouts at the two deposits within the True North project area.

Satellite	NWI Class	Hectares	Acres	
Central/Sheppard	**PFO4B**	**0.1**	**0.3**	
	PFO/SS4B	10.2	25.3	
	PSS4B	2.5	6.1	
Total Wetlands		12.8	31.7	
Uplands		24.1	59.5	
Land area		36.9	91.2	
Westridge/Steamboat				
West Ridge	PFO4B	2.4	5.9	
	PSS4B	8.5	21.0	
Subtotal: Wetlands		10.9		26.9
Uplands	U	20.8	51.4	
Steamboat	PFO4/1B	11.6	28.6	
Subtotal: Wetlands		11.6	28.6	
Uplands	U	49.0	121.1	
Total Wetlands		22.5	55.5	
Uplands		69.8		172.5
Land area		92.3		228.0

Source: ABR (2000c)

Because of the very common nature of these wetland types, the relatively site-specific nature and small area and intensity of absolute disturbance that would be caused by these site development layouts, the relatively low value of these wetlands, and the permitting requirements to mitigate wetland impacts at each site, there would not be significant cumulative wetlands impacts from development of these two deposits.

Westridge/Steamboat -- Table 4.20-2 shows that approximately 56 acres of wetlands, of a total area to be disturbed of approximately 228 acres, would be impacted if the

Westridge/Sheppard deposit were to be developed under this hypothetical scenario. Wetlands thus would constitute approximately 24 percent of the total disturbed area for this deposit.

As pointed out above, Westridge/Steamboat is in a different drainage than the True North deposit, and therefore would not cause impacts cumulative to the True North project. It also is the only deposit within the Pedro Creek / Goldstream drainage. For Westridge/Steamboat, like for Central/Sheppard, similar wetlands are very common not only in the area of the deposit but throughout the Pedro Creek / Goldstream drainage. These wetland types are generally considered low value wetlands . High value wetlands such as emergent marsh, riparian habitats, or open water are not found in the area that would be disturbed by development of either deposit. Thus, no wetlands considered “high value” would be disturbed by development of the Westridge/Steamboat deposit..

Because of the very common nature of these wetland types, the relatively site-specific nature and small area and intensity of absolute disturbance that would be caused by this site development layout, the relatively low value of these wetlands, and the permitting requirements to mitigate wetland impacts at the site, there would not be significant cumulative wetlands impacts from development of this deposit.

4.20.8.2. OUTSIDE THE PROJECT AREA

The potential site-specific loss of wetlands at the satellite deposits outside the project area (Ryan Load, Amanita, and Gil) is not a potential cumulative impact of these satellite deposits *on* the True North project area for two reasons. First, each of the deposits is in a completely separate drainage from True North, each of which eventually reaches the Tanana River at Fairbanks rather than 75 miles westward at the Tanana's confluence with the Tolovana River. Second, each is too far distant from the True North project area to be considered cumulatively with True North.

Nevertheless, FGMI have estimated the wetland loss at the satellite deposits outside the project area. The estimated areas of hypothetical development disturbance to wetlands at two potential satellite deposits *outside* the True North project area, excluding access roads, are presented in Table 4.20-3. These wetland community types are very common in the Chena River drainage as well as throughout interior Alaska. No wetlands usually considered as high value would be disturbed by development of these two deposits. While these values represent good faith, reasonable, hypothetical scenarios, it must be understood that they are estimates based upon currently available information. The third satellite deposit outside the project area, Ryan Lode, does not contain any wetlands.

Table 4.20-3
Disturbance to wetland and upland areas, based on national Wetlands inventory (NWI) maps, from hypothetical site development layouts at two deposits *outside* the True North project area.

Satellite	NWI Class	Hectares	Acres
Gil	**PSS4B**	**55.0**	**136.0**
Subtotal: Wetlands		55.0	136.0
Uplands	U	33.7	83.2
Amanita	PFO4B	72.6	179.3
	PSS4B	31.9	78.9
Subtotal: Wetlands		104.5	258.2
Uplands	U	25.6	63.4
Total:		159.5	
Wetlands			394.2
		59.3	
Uplands			146.6
Area		218.8	540.8

Source: ABR (2000)

Table 4.20-3 shows that approximately 394 acres of wetlands, of a total area of approximately 541 acres to be disturbed, would be impacted if both deposits outside of the project area (Gil and Amanita) were to be developed under these hypothetical scenarios. Wetlands thus would constitute approximately 73 percent of the total disturbed area at these two deposits. This compares to the approximately 152 acres of wetlands disturbance, of a total area of approximately 557 acres (27 percent of total disturbance) estimated if mine site development occurred at the deposits within the project area (Central/Sheppard and Westridge/Steamboat).

Because of the distance between these deposits, the relatively site-specific nature and small area of disturbance caused by these hypothetical site development layouts, the relatively low value of these wetlands, and the permitting requirements to mitigate wetland impacts at each site, there would be only minor site-specific wetland impacts from development of these two deposits (Gil and Amanita).

4.20.9 TRAFFIC

The potential traffic impacts from development of Central/Sheppard, and Westridge/Steamboat, within the project area, could be considered cumulative impacts on the True North project area. Central/Sheppard would use the same True North road. Westridge/Steamboat would use the True North road from Pedro Dome all the way to the mill. Development of these deposits, at True North and approximately 1.5 miles southwest of Pedro dome, respectively, would require ore trucks to pass under the Steese in the same manner and at the same location as would be used by ore trucks hauling from True North to the Fort Knox Mill. Because of the probable sequential nature of development of satellite deposits (with a short period of overlap), however, the number of ore trucks using this route likely would not be additive to another project, but rather would increase by approximately 4 years the time period during which ore would be hauled to the Fort Knox Mill on the True North access haul road. As discussed in Section 4.16 (Traffic), due to mitigation traffic impacts from development of True North would not be significant. Therefore, within the context of the True North project area and the traffic capacity of the access haul road, the traffic impacts from development of these other deposits within the project area would only lengthen the temporal period of access haul road use. Thus, the cumulative impacts would be minor.

Satellite-related access hauling would constitute an incremental increase in area traffic the same as incremental increases from other causes (e.g., tourists in summer, hunters in autumn, and skiers and other recreational users in winter). Unlike most other traffic increases related to an expanding population, however, (e.g., new homes on Cleary Summit) or new recreational pursuits (e.g., snow machining), once ore from the satellites were exhausted their related traffic would cease.

Because of the location and differences between the satellite deposits outside the True North project area, even if each was to be permitted and developed concurrently with True North, each would have its own route to the Fort Knox Mill and would not alter the route or the alignment of the True North road. Each satellite deposit outside the True North project area would undergo its appropriate permitting, including any required

NEPA review. Most impacts would be located at or near the particular satellite deposit site and would be specific to the general area of that deposit.

Assuming that the Fort Knox mill would be used to mill the ore, each such satellite deposit would require hauling of ore to the Fort Knox Mill. While a satellite deposit could be located in any direction from the Fort Knox Mill, at some point the haul routes would converge as they approached the mill, but in some cases not until right at the mill. Hauling ore from these dispersed sites outside the True North project area to the Fort Knox mill site within the project area might cause traffic impacts to the residential community in the vicinity of the Fort Knox Mill which could be cumulative with traffic impacts from Fort Knox and True North. The importance of those potential cumulative traffic impacts is discussed below within the context of the traffic design capacity of the Steese Highway within the project area.

The aspect of a potential deposit's development that could cause cumulative traffic impacts to the residential community in the vicinity of the Fort Knox Mill would be truck traffic hauling ore from the mine to the mill via the Steese Highway. Based on exploration status, location, and the amount of data accumulated to date, only development of the Ryan Lode deposit likely would involve hauling ore to Fort Knox via the Steese Highway. Because development of satellite deposits (if any), likely would occur sequentially rather than concurrently, potential traffic impacts from the Ryan Lode deposit would be representative of those for other hypothetical future satellite developments. Thus, a reasonable, but hypothetical, ore-hauling scenario for development of the Ryan Lode deposit is as follows:

- Approximately 2.4 million tons hauled over a 2.7-year period, or 900,000 tons per year
- Approximately 10 to 12 end dump trucks hauling ore 21 hour per day, 355 days per year (holidays excluded)
- Average of 2,500 tons of ore hauled in a 21-hour period
- Approximately 30 tons of ore hauled per truck
- Approximately 83 round trips per day
- Haul distance of approximately 40 miles from stockpile to mill one way

- 1 truck would pass a given point, in one direction or the other, approximately every 7.6 minutes

This traffic frequency of one truck passing a given point every 7.6 minutes would compare to a truck as frequent as every 3.75 minutes that could occur from development of the True North project.

The Highway Capacity Manual, Special Report 209 (Transportation Research Board, 1994) lists the maximum allowable service flow rate (capacity) under ideal conditions for a two-lane highway as 2,800 passenger cars per hour. To arrive at a realistic capacity for the specific stretch of the Steese Highway between Fox and Cleary Summit, factors such as average terrain, geometric, and traffic conditions (e.g., vehicle composition, no passing zones, directional traffic distribution, and lane and shoulder width) must be accounted for. Using the "General Terrain Methodology," from the Highway Capacity Manual, CH_2M Hill (2000) calculated two adjusted capacity values for this stretch of highway. The first, using the most conservative estimates for terrain and geometric conditions, yielded a capacity of 4,969 vehicles per day. The second, using more realistic estimates, yielded a capacity of 9,758 vehicles per day. The capacity volumes were determined in terms of maximum average annual daily traffic (AADT).

Based on the maximum capacity calculations above, and the AADT values in Table 3.22-1, the 1999 AADT for this stretch of the Steese Highway was between 13 and 26 percent of the highway's capacity. The daily traffic increase of 166 vehicles that would be attributable to development of the Ryan Lode deposit would increase the 1999 AADT to 1,460 vehicles, an average daily traffic increase of 13 percent. This would increase the 1999 annual traffic volume from between 13 and 26 percent of the highway's capacity to between 15 and 29 percent, depending on which adjusted capacity value is used. This would leave between 71 and 85 percent of the Steese Highway's traffic capacity between Fox and Cleary Summit unused. Also, by its very nature, ore hauling would be very spread out over a 24-hour period. Thus, its impacts would be very small during peak use periods. Thus, increased traffic from Ryan Lode would be insignificant within the context of the highway's design capacity.

Trucks from Ryan Lode would turn east off the Steese Highway onto the new True North haul road approximately one-half mile below Cleary Summit on their way to the Fort Knox Mill. Also, existing traffic to and from the Fort Knox Mine would use this road. This not only would remove approximately 348 vehicle trips per day from Fairbanks Creek Road near the residences, but also would remove the same number of vehicles from the steeper, upper one-half mile stretch of the Steese below Cleary Summit.

While the overall increase in traffic on the Steese Highway would be small, regular users of the highway likely would be aware of it, and it could extend their travel times. Within the context of the highway's traffic capacity, however, these effects would be minor because traffic on the Steese Highway is subject to change for other reasons. For example, between 1995 and 1999, annual average daily traffic (AADT) in this area actually *decreased* by 24 percent. Thus, development of the Ryan Lode deposit would not cause a significant increase in traffic on the Steese Highway, nor would it use a significant portion of the highway's remaining capacity. It could, however, extend by 2.7 years the overall period during which trucks would haul ore to the Fort Knox Mill.

At this time Ryan Lode is the only identified deposit whose development as a satellite mine would use the Steese Highway for hauling ore to the Fort Knox Mill. Because of the probable sequential nature of development of satellite deposits, however, the number of ore trucks using the Steese Highway likely would not be additive to another project, but rather would increase the length of time ore would be hauled to the Fort Knox Mill via the Steese Highway. As discussed above, this could last for the approximately 11-year remaining capacity of the Fort Knox tailings impoundment. Because the traffic volume would constitute only a small portion of the Steese Highway's capacity, such ore hauling would be insignificant within the context of the highway's design capacity.

Some public comments expressed concerns about normal Steese Highway traffic backing up behind ore trucks if ore were to be hauled from a satellite deposit outside the project area to the Fort Knox Mill via the Steese Highway. The primary area of concern was the hill from above the Pedro Monument to the turn off to the True North access haul road, a distance of approximately 1.9 miles. If it is assumed that normal traffic transits this distance at 50 miles per hour (mph), and an ore truck would average only

25 mph, then a worst case example would cause a driver behind an ore truck to take an additional 2.5 minutes to transit this distance.

Mitigating this situation would be several factors. Using the Ryan Load scenario discussed above, an ore truck would reach the bottom of the hill somewhat less frequently than eight times an hour. For the remainder of the hour, there would be no impact on normal traffic. So, over the period of time during which regular highway users likely would encounter this situation perhaps every fifth or sixth trip. Even then, all encounters would not commence at the bottom of the hill, but at various distances up the hill, thereby shortening the "wait time." Vehicles, of course, could pass the ore trucks before reaching the bottom of the hill. Ore trucks would not suddenly decelerate from 50 mph to 25 at the bottom of the hill, but would slow to the latter speed gradually, also shortening the wait period. Heading back from the mill, of course, the empty trucks would be able to maintain normal traffic speeds. Therefore, the cumulative impacts to other Steese drivers would be minor, little different qualitatively than drivers presently finding themselves behind a big recreational vehicle or a truck pulling a trailer of snowmachines.

Use of the Steese and other highways for hauling satellite mine ore to the Fort Knox Mill would be conducted according to ADOT/PF regulations concerning legal weight limits and other requirements. If circumstances were to arise under which it was determined that FGMI's road use required certain maintenance procedures or road improvements, these would be initiated under an agreement with the ADOT/PF. To the extent they would be applicable to trucks hauling ore from the Ryan Lode area, the same mitigation measures adopted by FGMI for the True North project as discussed in Section 2.3.21 (Mitigation) would apply.

The locations of the Gil and Amanita deposits (Fig. 4.20-1) are such that the ore hauling routes to the Fort Knox Mill would not use the Steese Highway. The routes would use a combination of existing mining roads and new routes that would head more directly to the mill and not access the mill through the Cleary Summit area. In hypothetical scenario wherein all three satellite deposits outside the project area (Ryan Lode, Gil and Amanita) were developed simultaneously, the access haul route would be different for each with no mingling of trucks until they virtually reached the Fort Knox Mine property.

Only Ryan Load would use any of the True North access haul road, and then only the eastern segment. Therefore, any effects from such ore hauling would be small and not cumulatively significant within the context of the True North project area in general, nor within the context of the Cleary Summit community in particular.

4.20.10 NOISE

Satellite mines using the Fort Knox Mill might generate noise that could be heard by residents in the vicinity of the Steese Highway and Cleary Summit. For example, mine site operations at the Gil deposit, approximately eight miles northeast of the Fort Knox Mill, might generate noise sufficient to be heard at Cleary Summit. Such noise would not be cumulative with that from the True North mine site noise because 1) True North mine site noise is not expected to be heard at Cleary summit, and 2) the True North Mine very likely would be closed before the Gil deposit were developed, if at all. Such noise would be cumulative only in the sense that sequential use of the same mill by satellites and the True North project could result in developing an infrastructure for access that would result in traffic noise for a longer period of time than just from the True North project itself. Such noise, however, would not exceed the FHWA (2000) standard of 67 dBa for residences, churches, schools, and recreational uses (See Section 4.10).

No foreseeable non-mining developments were identified that would significantly increase Steese Highway traffic noise in the vicinity of Cleary Summit. Only a slow, incremental increase in use of the Steese by tourists, hunters, and skiers can reasonably be expected. Between 1995 and 1999, AADT in this area actually *decreased* by 24 percent (Table 3.22-1). Thus, cumulative noise impacts from use of the Fort Knox Mill for the True North project and future satellites likely would not be qualitatively greater because the noise levels would not exceed the generally accepted FHWA (2000) noise standards for residential areas at Cleary Summit. The duration of time over which such noise were generated could increase as new satellite mines were developed. Because ore truck hauling noise levels would not exceed the FHWA standards for residential areas, and because the additional vehicles attributable to development of satellite deposits would increase traffic only incrementally, and certainly

not approach volumes anywhere near the number of vehicles for which the roads were designed, there would be no significant cumulative noise impacts.

4.20.11 LIGHT POLLUTION

Mitigation techniques for the stationary lights of individual satellite projects would minimize light pollution. The movement of trucks in view of residential areas in the Cleary Summit vicinity from a sequence of satellite developments could last for the remaining approximately 11 years life of the Fort Knox tailings impoundment. As discussed above in Section 4.17 (Light Pollution), light from the trucks would be similar to that from existing traffic on the Steese Highway and on Pedro Dome / True North and Fairbanks Creek roads. While ore hauling traffic from True North or other satellite deposits would increase traffic in the general area, overall traffic levels still would remain far below existing road traffic capacities.

As discussed above in Section 4.16 (Traffic), the large majority of Fort Knox Mine traffic presently using Fairbanks Creek Road immediately in front of the Cleary Summit residential area would be diverted to use the new haul road approximately 690 feet further away and 160 feet lower in elevation than Fairbanks Creek Road. This would reduce trips on Fairbanks Creek Road by approximately 348 vehicles per day. This non-ore hauling traffic would continue to use the new haul road even after True North and other satellite projects were completed, thus keeping these vehicles off the upper one-half mile stretch of the Steese below Cleary Summit as well.

Section 4.14 (Visual Resources) discusses impacts from vehicle lights on residents on Cleary Summit, and concludes there would be no significant impacts from ore trucks moving round trip between the True North Mine and the Fort Knox Mill on the access haul road. Using the same significance criteria, ore trucks from satellites outside the project area using the Steese Highway would only use the eastern segment of the haul road to Fort Knox. Therefore, from the perspective of a Skiland Subdivision resident looking south, headlights would be noticeable only for approximately one minute when returning from the mill to the Steese Highway. This would amount to considerably less exposure to light than from trucks hauling from True North that would be visible for up to two minutes when heading west to east as well.

Thus, developing an infrastructure for access to the satellites likely would result in increased vehicular use for a longer period of time than just for the True North project itself. Such use, however, would be well below the existing road traffic capacities in the Cleary Summit area. Light pollution from development of satellite deposits therefore would be insignificant.

4.20.12 OTHER RESOURCES

Construction of new access haul roads to other deposits, and upgrading of portions of others, could open new portions of the True North project area for residential, commercial, or industrial development. This could include land sales by the State or the MHLT. State land disposals would have to conform with the State's land classification criteria, and any developments would have to conform with FNSB zoning requirements. These entities, however, have no present or foreseeable development or disposal plans in the project area.

For several other resources, including hydrology, water quality, fish, wildlife, cultural and visual resources, and recreation, cumulative impacts within the True North project area from Central/Sheppard and Steamboat/West Ridge would not be significant largely because of the distances between the locations, the sequential nature of their development, their individual short life, the relatively site-specific nature and small area of disturbance caused by these potential mining projects within a project area context, and the project-specific permitting requirements to mitigate impacts.

Potential site specific impacts to these resources at the three satellite deposits outside the project area are not impacts of the satellite deposits on the True North project area which must be considered cumulatively with the True North impacts because each satellite is too far distant from the True North project area to significantly impact the project area.

Some cumulative impacts often associated with other resource-development projects, however, would be absent from the True North project area. Although some additional road construction might occur to minimize noise and safety impacts on local residents, no new major roads would be built that would access currently inaccessible areas. No new community would be established that by its simple presence would affect

substantially a new area, and whose existence long after the project terminated would have continued impacts.